CN-100 Network Analyzer

10-Gigabit Ethernet, 10/100/1000Mbps Dual Media Ethernet Test Module

CN-100 Manager User Manual

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CAUTION: THE FIBER-OPTIC INTERFACE CONTAINS A CLASS 1 LASER DEVICE. DO NOT LOOK INTO THE CONNECTOR LABELED "TRANSMIT". INVISIBLE LASER ENERGY IS EMITTED FROM THAT CONNECTOR WHENEVER THE TESTER IS POWERED UP.

TABLE OF CONTENTS

1 Introduction 4
1.1 Purpose 4
1.2 Hardware Overview 4
1.2.1 Chassis 4
1.2.2 Front Panel 5
1.2.3 Back Panel 5
1.2.4 Side and Top Views 5
1.2.5 Interface Modules 5
1.3 Software Overview 6
1.3.1 CN-100 Manager 6
1.3.2 Command Line Interface 6
1.3.3 C-Library 6
1.4 SUPPORT INFORMATION 6
2 INSTALLATION 7
2.1 CN-100 Set-up 7
2.2 CN-100 Manager 7
2.2.1 CN-100 Manager System Requirements 7
2.3 Manager Software Installation and Update 7
2.3.1 Manager Software CD Installation 7
2.3.2 CN100 Manager Software Update 7
3 Configure Chassis IP Address 8
3.1 Configure Chassis IP Address Setup Using Manager 9
4 Operations 10
5 Firmware Update 12
6 Software update: 13
7 MANAGER Main Screen 14
8 Ethernet Parameters 15
8.1 Manager Navigation 15
8.2 Off-Line Configuration 16
8.3 On-Line Configuration 16
8.4 CN-100 Main Window Top Keys 16
8.4.1 File Menu 16
8.4.2 Operations-Connection Setup: 16
8.4.3 Display Counts 17
8.4.4 TESTS 17
8.4.5 Connect/Disconnect 17
8.4.6 Help 17
8.5 Group Controls 17
8.6 Port Controls 17
8.6.1 Start Transmit 18
8.6.2 Stop Transmit 18
8.6.3 Step 18
8.7 Transmit Modes 18
8.7.1 Continuous Mode 18
8.7.2 Single Burst Mode 18
8.7.3 Multiburst Mode 18
8.7.4 Continuous Multiburst Mode 18
9 Port Configuration 19
9.1 Port Parameters 19

10 Trigger..... 20
10.1 Receive Triggers 20
11 Transmit Setup.....21
11.1 Streams and Frames..... 23
11.2 Add Streams..... 23
11.3 Frame Definition 23
11.4 Frame definition- Tree View 24
11.5 Frame Rate/Bandwidth..... 25
11.7 Transmit Setup with Frame Rate/Bandwidth per stream: 27
12 Ethernet Counters 28
13 IP Counters..... 29
13.1 Transmit IP Counters..... 29
14 Receive IP Counters 30
15 IP QoS Statistics..... 31
16 MII Registers SETUP 32
16.1 MII Manual Register Update..... 32
17 LAN QoS Tests..... 33
18 Capture Buffer Setup..... 36
18.1 Captured Data- Spreadsheet View..... 38
19 ARP/Ping..... 39
20 Data Integrity..... 40
21 Unscheduled Insertion Frame 40
22 Bit Error Rate Test Overview..... 41
23 Ports Connection Configuration 43
24 BERT Test Setup..... 44
25 Port Configuration..... 45
26 BERT Status and Counters..... 46
27 Ethernet Bit Error Rate Test Tutorial #1..... 47
28 RFC2544 Test Overview..... 50
29 Traffic Mapping..... 50
30 Port Property..... 51
31 Test Setup..... 51
32 Test Log..... 52
33 Throughput Testing (RFC2544, section 26.1)..... 53
34 Latency Testing (RFC2544, 26.2) 54
35 Frame Loss Testing (RFC2544, section 26.3)..... 55
36 Back-to-Back Testing (RFC2544, section 26.4) 56
37 RFC2544 Throughput Tutorial #1..... 57
38 RFC2544 Tutorial #2 59

1 Introduction

The Compass Networks CN-100 Analyzer is the premiere 10/100/1000 Mbps Ethernet, 10 Gigabit Ethernet, ATM/SONET analyzer designed to meet the needs of equipment manufacturers, telecommunications carriers, system manufacturers, research labs and network end users.

The CN-100 generates, receives and monitors and captures traffic on at full line rate across each independent port. The CN-100 monitors networks for framing status, performance analysis, and alarm and error reporting of 10/100/1000 Mbps Ethernet, 10 Gigabit Ethernet, SDH, PDH, and ATM connections.

Compass engineers have implemented the latest in FPGA design in order to deliver highly efficient cost effective testing solutions. The CN-100 allows users to test multiple interfaces with one simple platform across a variety of protocols and physical interface modules.

The CN-100/1000 is designed to offer a cost effective solution for today's complex networking requirements. Compass Networks Multi-port CN-100s provide a standard platform that is easy to use reducing training time and expense of multiple testers. The performance and scalability of the CN-100 will meet your needs for today and tomorrow.

Applications

- Ideal for Installation & Maintenance-Network Commissioning, R&D, Manufacturing- QA and Research & Development.
- Emulate end equipment or transmission network equipment
- Perform Functional test, regression test and stress test
- Conformance – Verify product meets standards
- Interoperability – Verify product works with other products
- Performance – Verify product works under different traffic conditions
- Fault Finding, Reduce costly recalls of bad equipment

1.1 Purpose

The user guide is written for users of the CN-100/1000 Chassis, interface modules and Manager Software. Users should have a basic understanding of data communications and/or networks. The user guide describers how to control the CN-100/1000 Manager to configure the CN-100 perform predefined and user defined test and how to analyze the test results.

1.2 Hardware Overview

Compass CN-100s generate traffic and monitor network performance. The CN-100 consists of a multi-port portable or rack mount chassis with interchangeable optical and electrical interface modules. The interface modules generate, receive, capture and analyze traffic at full line speed. Technical specifications are provided in Appendix A.

1.2.1 Chassis

The CN-100 chassis is the housing for the interface modules. It contains a processor, LAN interface, backplane and power for the interface modules.

CN-100P

The CN-100p (portable) is a portable 2-Slot chassis designed for field technicians to easily perform daily installation and maintenance for today's electrical and fiber networks. The 2-slot chassis can support any variety of physical interface modules.

- Front Panel Keypad, LCD, Alarm LED's and LCD display alarms, errors, and traffic status while providing a PASS/FAIL result.

CN-100R

The CN-100r (rack mount) is portable unit with rack mount hardware that can easily mount in a 19-inch or 21-inch rack. The 2-slot chassis can support any variety of physical interface modules.

- Front Panel Keypad, LCD, Alarm LED's and LCD display alarms, errors, and traffic status while providing a PASS/FAIL result.
- Unit includes hardware kit that enable the CN-100 to mount easily to any 19-inch or 21-inch rack.

CN-1000

The CN-1000 is a high density chassis designed to maximize your testing capabilities. The 12-Slot chassis can support any variety of physical interface modules. For higher density application just assigns a master chassis and daisy chain additional unit.

1.2.2 Front Panel

The front panel of the Chassis has three LEDs for system indication:

- POWER-when unit is powered up,
- LINK- for serial connection,
- READY-Unit is initialized and ready for use

Below the LEDs is a four line by 20-character LCD display. The display is backlit and provides information on self test status on power up, default firmware versions and the tester IP address.

To the side of the display is a 4 key keypad:
(see appendix B for Keypad functionality)

- PORT selects the port(s) in which the selected function is sent to.
- MENU selects from various menu options.
- FUNC- Function key scrolls various options.
- ENT- Enter key executes displayed function to CN-100.

Also on the front plane are slot indications to uniquely identify the interface modules once they are configured.

- S1: Slot 1 accepts any CN-100 interface modules and refers to ports 1 and 2 for 10G module, port 1 to 4 for 10/100/1000 Ethernet module.
- S2: Slot 2 accepts any CN-100 interface module and refers to ports 3 and 4 for 10G module, port 5 to 8 for 10/100/1000 Ethernet module.

1.2.3 Back Panel

The back panel of the chassis has the ON/OFF rocker switch for powering the system up and down. In addition, four interface connections are provided:

- 10/100 Ethernet: 10/100 Ethernet for LAN connection and operation of CN-100
- RS232: Serial connection for CN-100 operation
- input from a daisy chain additional unit
- output to a daisy chain additional unit

1.2.4 Side and Top Views

The sides of the chassis are vented for air-cooling of the unit. In addition, Phillip head screws are used on the chassis on the top and sides, to provide easy access to the inside of the unit. These screws are used by

the factory for assembly and maintenance and customer use invalidates the warranty. The bottom of the chassis has rubber feet to ensure stability.

1.2.5 Interface Modules

A wide variety of interfaces modules are available supporting multiple protocols and medias. Please see the interface module appendix for details and specifications on Interface module hardware.

1.3 Software Overview

In addition to the keypad on the chassis, control of the CN-100 hardware can be accomplished by one of two software interfaces – the Command Line Interface (CLI) and a graphical user interface (CN-100 Manager), either the CLI or CN-100 Manager is required to create and set test patterns.

1.3.1 CN-100 Manager

The CN-100 is a windows-based graphical interface that has the look and feel of the CN-100 hardware. The CN-100 Manager connects to the CN-100 via the RS-232 port or 10/100 Ethernet connections. The Manager program allows complete control of the installed interface modules to run a variety of predefined or user defined tests that can be easily saved and recalled later.

1.3.2 Command Line Interface

The CLI is a text-based command language used for configuration, control, and status monitoring of the test set operation. The CLI runs on a terminal (or terminal emulator program such as Procomm) and connects to the CN-100 via the RS-232 port. The CLI commands allow for full control the unit and a macro capability is provided. (Please see CLI Manual)

1.3.3 C-Library

A powerful C-Library provides a user friendly environment which allows programmers control of all aspects the CN-100's hardware operation

1.4 SUPPORT INFORMATION

Compass Networks Technical Support may be contacted via telephone or email. Please have available the following information:

- Your name and company name
- Model number
- Serial number
- Hardware and software Version number found under help
- Description of problem including configuration parameters.

Technical support can be reached at:
Email: support@compassnettest.com
Telephone: 818-781-7875

Installation

2 INSTALLATION

2.1 CN-100 Set-up

The first step in using the CN-100 is the hardware installation:

- Chassis – portable or rack mount. The CN-100 will need to placed or installed for operation.
- Interface modules. New systems will come with the interface modules installed. Otherwise, using the thumbscrews on the unit, the modules need to be guided in and secured.
- Power cord. The power cord is located in the back of the unit and needs to be plugged in.
  Cables. For use of the CLI or CN-100 Manager, a RS-232 connection and/or a 10/100 Ethernet connection is required. This manual will use the CN-100 Manager in its examples for control of unit. The CLI User's Manual provides the details of the CLI commands for similar use.

2.2 CN-100 Manager

2.2.1 CN-100 Manager System Requirements

The CN-100 Manager requires a computer with the following requirements:

- Windows® 95/98, 2000, ME, XP, NT.
- 200 MHz Pentium or Equivalent Processor
- 64 MB RAM—128 MB recommended
- 50 MB Disk Space
- 1024 x 768 Resolution, 256 Colors or Higher
- CD-ROM

2.3 Manager Software Installation and Update

2.3.1 Manager Software CD Installation

The following instructions define how install the Manager Software using the Manager installation CD.

1. Insert CN100Manager CD into drive.
2. Auto Run will begin otherwise browse CD contents and run the "setup.exe" program. (If the menu does not come up, click on the START button and select Run. In the box, select the CD-ROM drive and type setup.exe.)
3. You will be prompted to select the installation path, press ENTER or OK to take default or choose default and press ENTER or OK

2.3.2 CN100 Manager Software Update

The following instructions define how to update previously installed Manager Software.

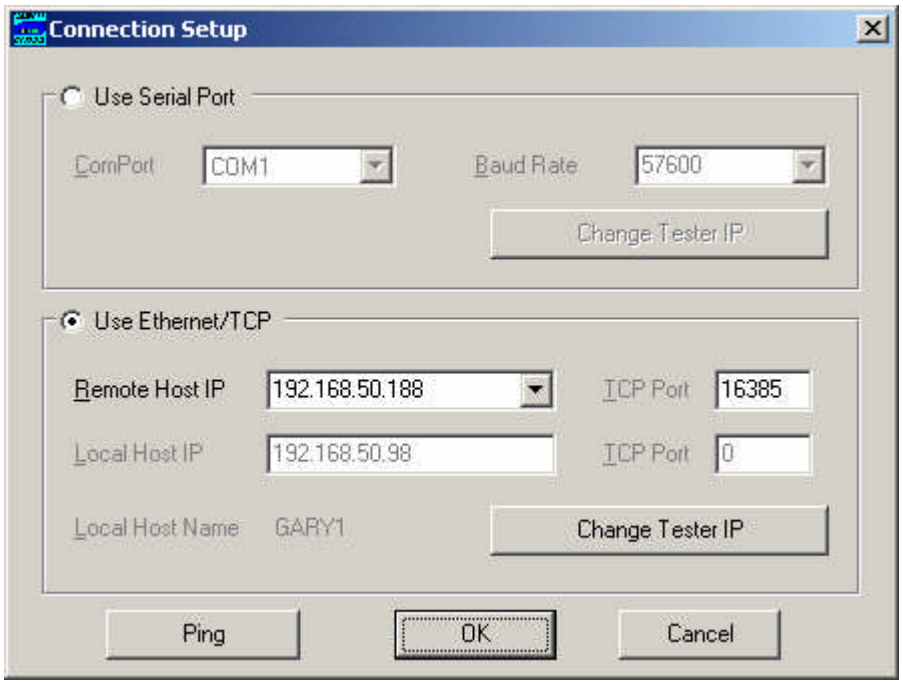
Software update: Use the CN100Manager.exe file to replace the older file.
1. Locate the installed CN100Manager.exe file

2. Copy new CN100Manager.exe to the specified folder to replace the CN100Manager.exe file
3. Run CN100 Manager Software
4. Verify Version by clicking help found on the top right of the main screen.

3 Configure Chassis IP Address

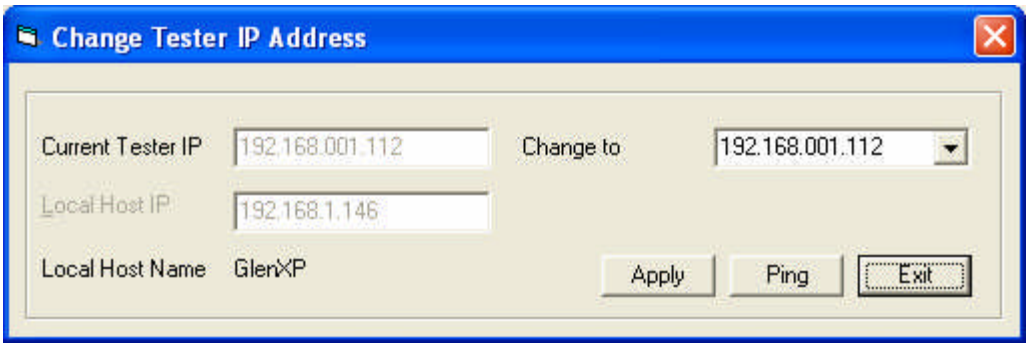
The following instructions define how to configure the IP address of the Tester using the Manager software. You will need a straight thru DB9 cable for RS232 Serial port Connection and a CAT 5 Ethernet cable to use the Ethernet Port. (To connect the tester directly to your computer an Ethernet crossover cable is required)

1. From the Main Screen select Operations, ConnectionSetup.
2. Select Use Serial Port (need serial connection to configure tester IP address)



3. Select Change Tester IP:

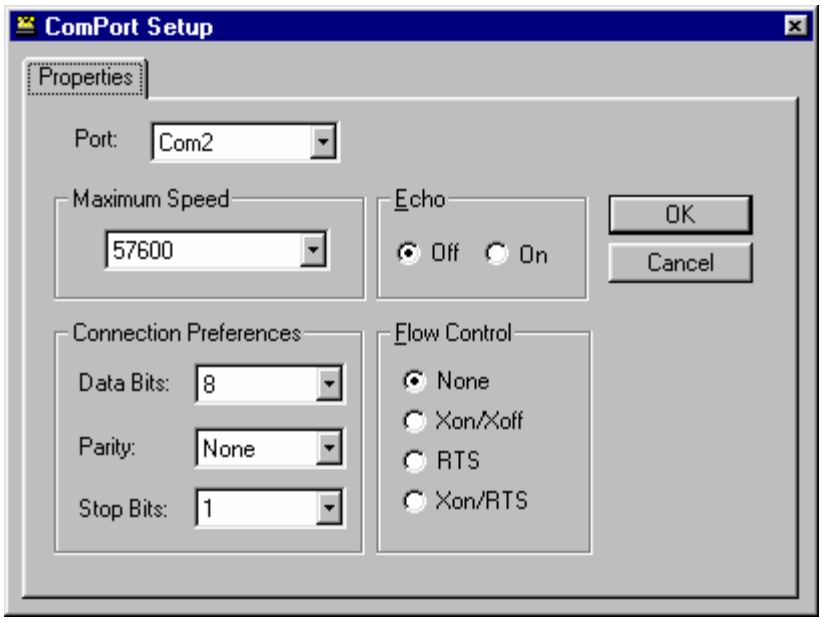
Local Host IP- Displays Local Host IP address
Note-The Chassis Current IP address is displayed on the LCD of the Chassis



4. Change to- Enter IP address in Change to (sets the tester IP address via serial port connection)
5. Click Apply (you are asked to switch from serial to Ethernet connection)
6. Click Connect To Connect to Tester (From Main Screen) Once Link is established CN100 Manager displays source and destination IP address along the bottom of the Main Screen.
7. To verify Ethernet Connection
    a. Click connection setup
    b. Use Ethernet/TCP
    c. Enter Remote Host IP (CN100 IP address)
    d. Click Ping to verify connection
    e. Click OK (returns to Main Screen)
    f. Click Connect To Connect to Tester (From Main Screen) Once Link is established CN100 Manager displays source and destination IP address along the bottom of the Main Screen

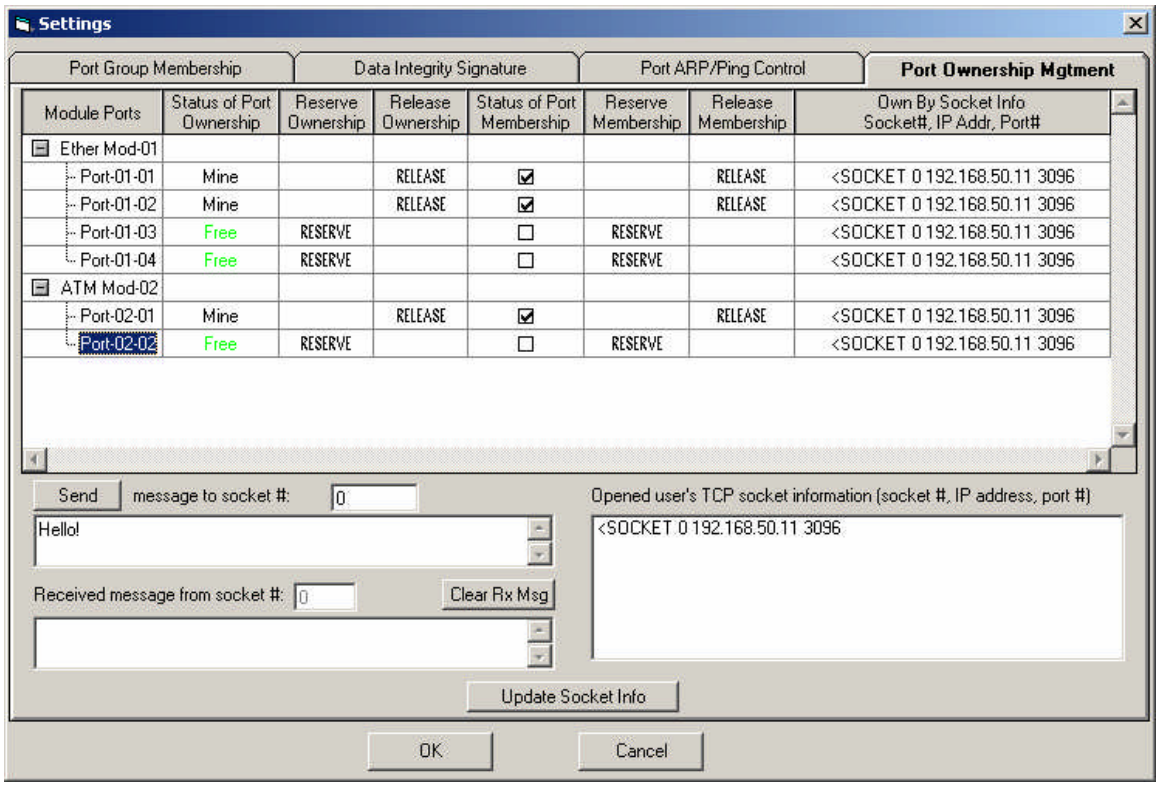
Physically connect the CN-100 to the PC's COM1 port (or other desired port on the PC) the connector on the CN-100 is a male DB9.

Go to Com Setup pull down menu and select ComPortSetup. Comport Properties will be displayed as shown in Figure 2.2. Initialize the COM1 port (or other PC port you plan to use to connect to the CN-100). It is suggested to use speed of 57600, echo off, data bits 8, parity non, stop bits 1, and flow control none. The only setting that is optional for the CN-100 is the COM port to which the tester is connected. The other settings must be left as the default values occur. Serial linkage is over a direct serial cable. (DO NOT use a null modem, reversal of the signal lines is not acceptable.) Press the OK button when completed. You will be returned to the CN-100 Manager main control screen.

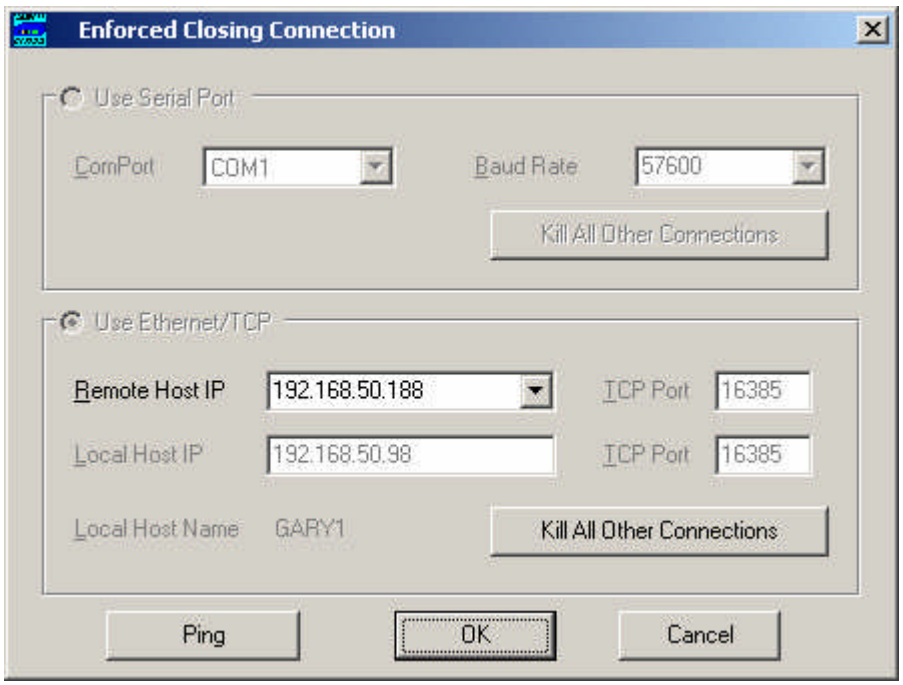


4 Multi Users per Port Operations

The following instructions define how to configure the port ownership configuration for multi user per port operations. Users can reserve or release the port ownership on the CN100, up to eight users can control a full load two Ethernet Modules CN100 by own one port. User can send or receive messages to each other for communications via CN100 Manager. Users can through the User's TCP socket information window to know the ownerships of each port on the CN100.



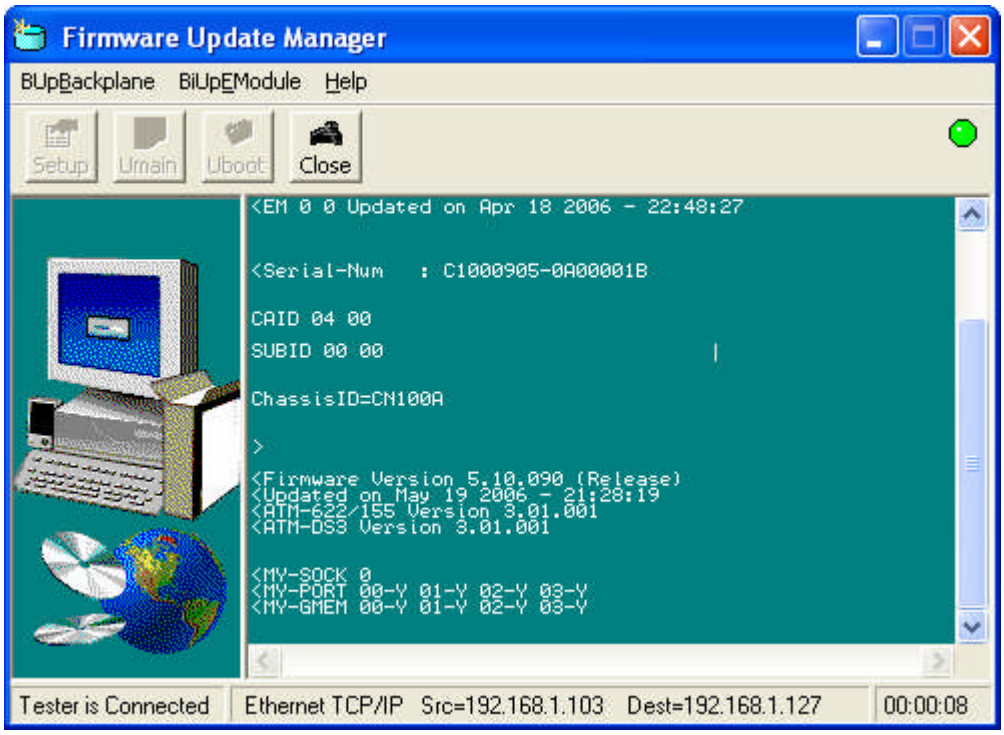
Enforce Closing Socket Connection.
The kill connection is used to force a TCP connection closed. Enter the remote Host IP address of the CN-100 tester and click Kill Connection. This function can also be used to end a TCP connection in the event the CN100 Manager is not responding.



5 Firmware Update

Updates are available online or via email to allow users access to the latest in enhancements and features. Please contact manufacturer or your local sales representative online or by phone to see if there are updates available for your model.

Update Manager



Firmware Update: EM_all.bft (firmware version 5.00.xxx)
The .bft or .s3 file is the file used to update the Tester Firmware. Run the ***Compass UpdateManager*** program and follow the update instructions below.

Note: Please do not power off unit or remove connection while updating
1. Save CN100 Firmware version i.e. 5.00.xxx
2. Create CN100 folder version 5.00.xxx on a local drive
3. Copy files to new folder
4. Connect CN100 to pc using either the Ethernet port on the back of the chassis or the serial port and power on
5. Open UpdateManager.exe
6. Click setup and select either serial port or Ethernet port and click ok (this closes comport setup)
7. Click open (links to CN100)
8. Click Binary Update, select file to update **EM_all.bft** the update takes a few minutes, when done click reset Tester
9. Close update program

PLEASE DO NOT POWER OFF UNIT OR REMOVE CONNECTION WHILE UPDATING AS THIS WILL CAUSE CHASSIS NOT TO ACCEPT NEW UPDATE.

6 Software update:

Updates are available online or via email to allow users access to the latest in enhancements and features. Please contact manufacturer or your local sales representative online or by phone to see if there are updates available for your model.

The following instructions define how to update previously installed Manager Software. Use the CN100Manager.exe file to replace the older file.

1. Locate the installed CN100Manager.exe file
2. Copy new CN100Manager.exe to the specified folder to replace the CN100Manager.exe file
3. Run CN100 Manager Software
4. Verify Version from Main Manager Screen, click Help, About Tester.

Operation

7 MANAGER Main Screen

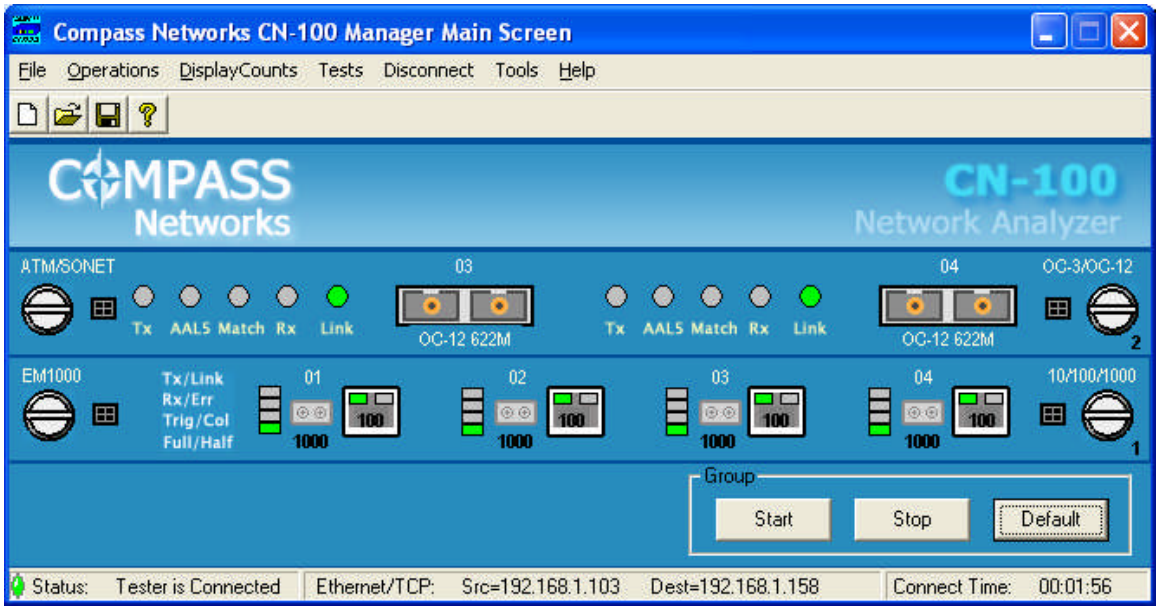


Figure 2.1 shows slot 1 EM1000 10/100/1000 Dual Media Ethernet and slot-2 ATM-OC12/OC-3.
The active ports are illuminated while the port type and speed is displayed representing populated slots in the CN-100 chassis.
Note- Connecting to the Manager/CLI disables the front keypad to prevent conflicting commands.

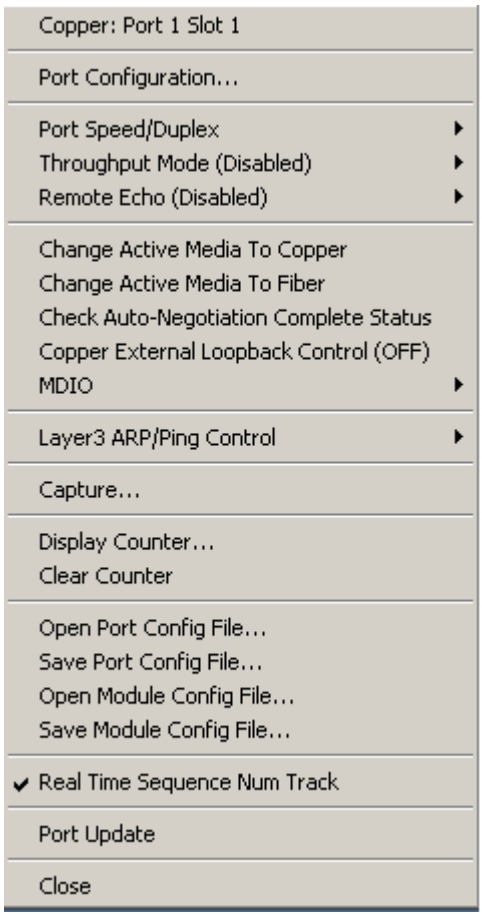
8 Ethernet Parameters

Dual Media 10/100/1000 Mbps Ethernet Interface Module

8.1 Manager Navigation

Left-clicking
Left-Clicking over a port on the opens the selected ports menu options. Left clicking anywhere on the interface other than a port closes the port menu options.
Right-Clicking
Right clicking on an interface or slot opens other menu options.
Change Interface Module Type
Right clicking a slot when off line will allow you to select the interface module type for off line configuration you can save to a file for later use.

Left Click On an Ethernet Port

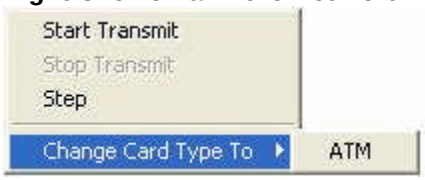


Port configuration- Opens Port Setup Window

Speed/ Duplex - Select 10/100/1000 speed. And select Full or Half Duplex
Throughput Mode- Enable or Disable Throughput Mode
Remote Echo- Enable or Disable Remote Echo
Change Active Media - Copper/Fiber
Check Auto-Negotiation- Check AN status
External Loop back- Copper External Loop Back Control
MDIO-MII registers
Set MII Registers to default
PHY Master/Slave control
Auto negotiation Status and Action
MII advertise
Restart auto negotiation

Layer 3 ARP/Ping Control-Send Ping/ARP, show ARP table
Capture-Open Capture Setup Window and start capture
Display Counter-Launches Port Counters display
Clear counter-Clears Port Counters
Open Port Config File…-Open saved config file
Save Port Config File…-Save config file for the port
Open Module Config File…-N/A
Save Module Config File…-N/A
Real Time Sequence Num Track…-N/A
Port update-Write Port Configuration to Port
Close- Close Menu Options

Right Click on an Ethernet Port



Right Click
Right clicking on an Ethernet port will allow you to start transmitting, stop transmitting or step transmit
Change Card Type To
Change the card type

8.2 Off-Line Configuration

On initial startup of the Manger software the module images will be blank; you can select an interface to configure by right-clicking the slot you want to change and selecting an interface module.
Once an interface module is selected, just click the port you would like to configure and create the desired port settings. Port, modules and chassis configurations can be copied, pasted and saved for your convenience. Note-not all interfaces or options are accessible off-line.

8.3 On-Line Configuration

Connecting to a chassis automatically reads the chassis's available interfaces and ports. You can easily load configuration files and begin your testing.

8.4 CN-100 Main Window Top Keys

8.4.1 File Menu

New
Load the manufacture default system setup to replaces the current system setup for all ports of the system.

Open…
Load-Load command replaces the current system setup with a previously saved system setup. In the Open File dialog box, enter or select the name file you wish to load. Configuration files have the suffix ***.cfg.*** Selecting new opens a new configuration file with all of the settings reset.

Save
The Save commands saves the current system setup to the current system filename.

Save As
The Save As command saves the current system setup to a different system filename. Enter the new system filename in the Save As dialog box.

Exit
Close the CN-100 Manager

8.4.2 Operations-Connection Setup:

Used to set-up the properties for the comport connection. (See Comport/Chassis IP setup for details)

8.4.3 Display Counts

ATM Counts: Display Global Aggregate Counts – Display all port counts, rate, peak rate, and bandwidth on real time base. (See ATM Counters)
LAN Counts: Displays LAN Counters (See LAN Counters)
LAN Tx Streams Spastics Counts: Displays LAN Tx Streams Spastics (See LAN Tx Streams Statistic Counters)
LAN Rx Flow Statistics Counts: Displays LAN Rx Flow Statistics (See LAN Rx Flow Statistics Counters)

8.4.4 TESTS

Tests feature allows you to select available test procedures for each of the installed interface modules.
ATM QoS_O.191 tests to be performed on ATM interfaces- (See ATM QoS testing)
LAN QoS Statistics- Tests for QoS testing and displaying statistics and histograms. - (See LAN QoS Statistics)
LAN IP Frame BERT tests.- Bit Error Test for IP Frames (See LAN Ipv4 Frame Bert)
RFC2544 – Ethernet Benchmarking Methodology performance test. – (See RFC2544 Testing)
RFC2889 – Ethernet Benchmarking Methodology performance test. – (See RFC2889 Testing)

8.4.5 Connect/Disconnect

From the Manager main screen, click on Connect/Disconnect. This is a toggle key, to disconnect the serial connection, click on the same button. Linking to the Chassis form the Manager Software/CLI disables the front keypad to prevent conflicting commands.

8.4.6 Help

About: Displays Current Software Manager Version, Firmware version and chassis serial number.

8.5 Group Controls

- Start: Starts transmitting on all selected group members
- Stop: Stops transmitting on all selected group members
- Default, Sets Chassis to the manufacturers default setting

8.6 Port Controls

8.6.1 Start Transmit

Starts the transmitting on all selected ports in the mode defined at the port level.

8.6.2 Stop Transmit

Stops transmitting on selected ports.

8.6.3 Step

Step sends one packet from each of the selected ports.

8.7 Transmit Modes

8.7.1 Continuous Mode

Transmits a constant stream of packets at user-defined Interspaced Gap.

8.7.2 Single Burst Mode

Transmits a single burst at the user-defined Interspaced Gap.

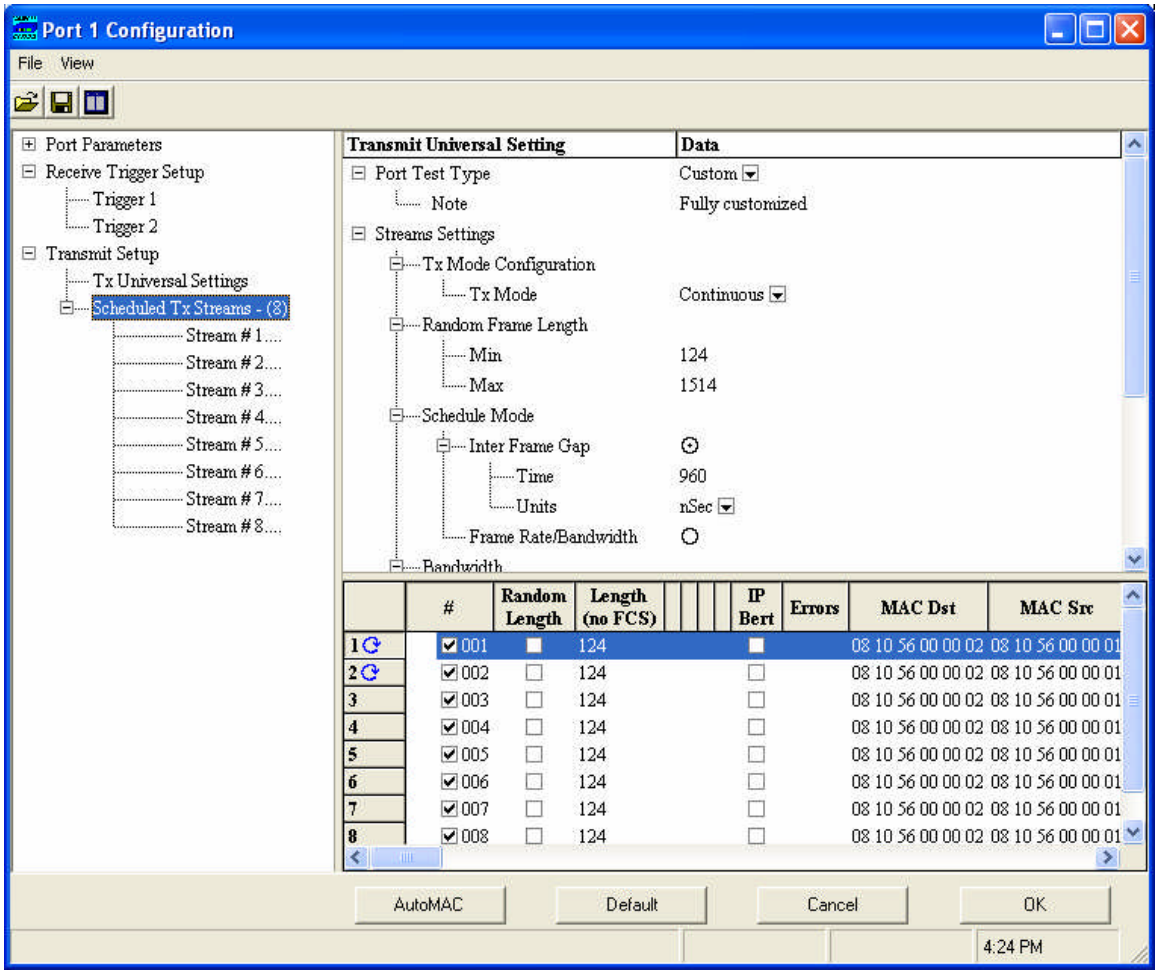
8.7.3 Multi-burst Mode

Repetitive bursts with a user-defined delay between each burst.

8.7.4 Continuous Multi-burst Mode

Transmits multi-burst mode continuously.

9 Port Configuration


Port 1 Configuration
File View
Port Parameters
Receive Trigger Setup
Trigger 1
Trigger 2
Transmit Setup
Tx Universal Settings
Scheduled Tx Streams - (8)
Stream # 1....
Stream # 2....
Stream # 3....
Stream # 4....
Stream # 5....
Stream # 6....
Stream # 7....
Stream # 8....
Transmit Universal Setting
Data
Port Test Type
Custom
Note
Fully customized
Streams Settings
Tx Mode Configuration
Tx Mode
Continuous
Random Frame Length
Min
124
Max
1514
Schedule Mode
Inter Frame Gap
Time
960
Units
nSec
Frame Rate/Bandwidth
Bandwidth
Random Length Length (no FCS) IP Bert Errors MAC Dst MAC Src
1 001 124 08 10 56 00 00 02 08 10 56 00 00 01
2 002 124 08 10 56 00 00 02 08 10 56 00 00 01
3 003 124 08 10 56 00 00 02 08 10 56 00 00 01
4 004 124 08 10 56 00 00 02 08 10 56 00 00 01
5 005 124 08 10 56 00 00 02 08 10 56 00 00 01
6 006 124 08 10 56 00 00 02 08 10 56 00 00 01
7 007 124 08 10 56 00 00 02 08 10 56 00 00 01
8 008 124 08 10 56 00 00 02 08 10 56 00 00 01
AutoMAC
Default
Cancel
OK
4:24 PM

9.1 Port Parameters

General Settings

Preamble Length (byte): Define Preamble length (2-16 bytes)
Obey Pause Flow Control (enable or disable pause flow control)

Layer 3 Settings

MAC Address: define MAC address

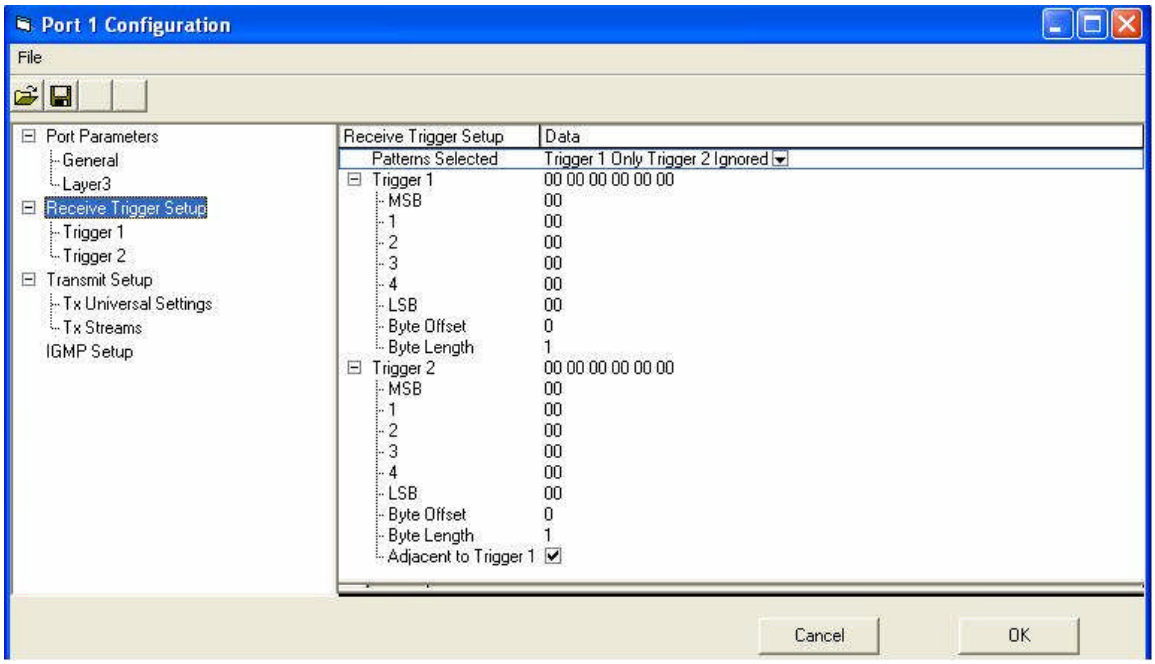
IPv4 Settings

IP address
Net mask
Gateway
Ping Target
Ping frequency

IPv6 Settings

IP address
Net mask
Gateway
Ping Target
Ping frequency
Subnet Mask Length

10 Trigger

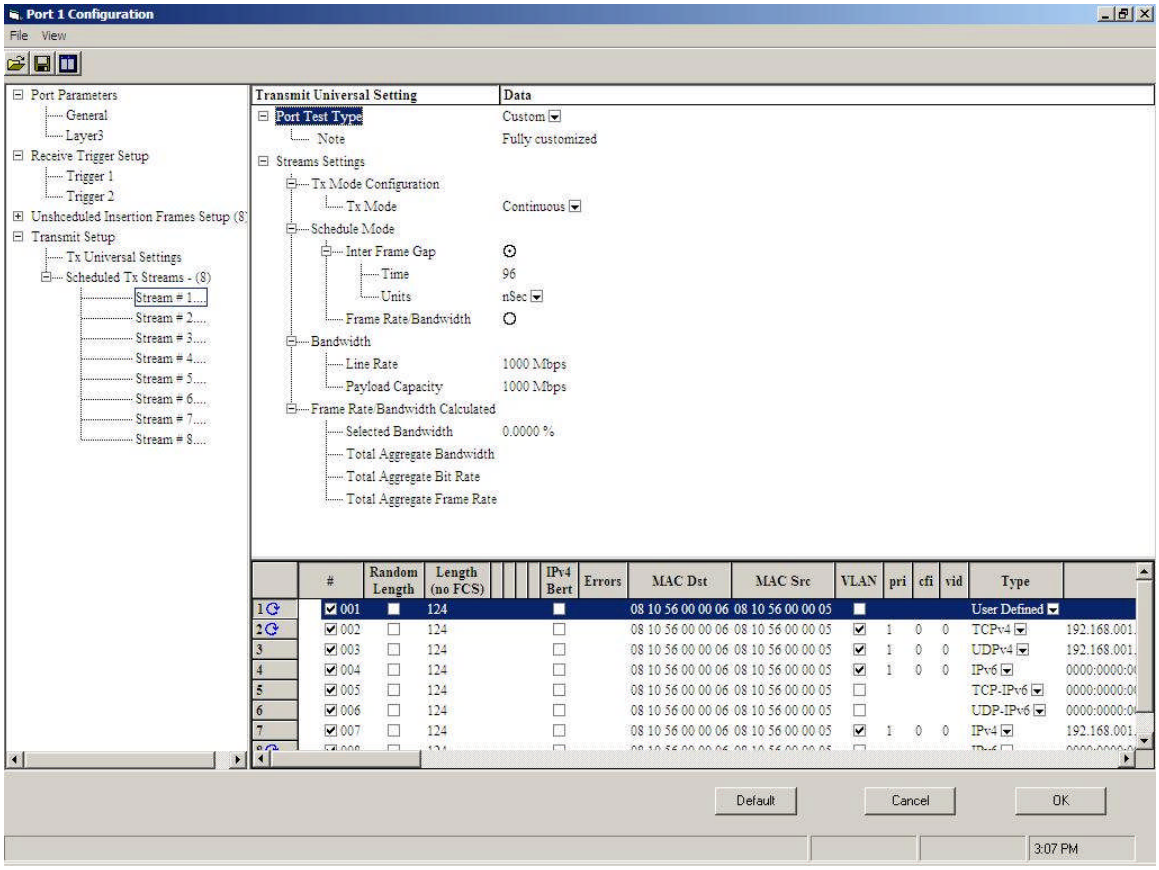


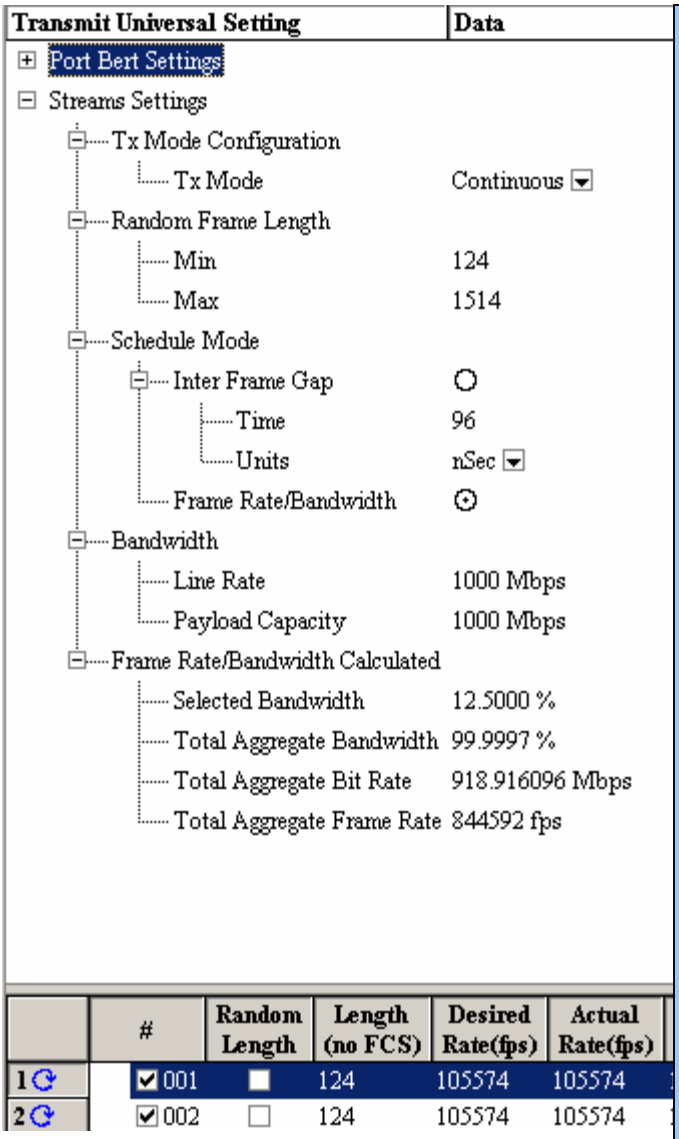
10.1 Receive Triggers

2 receive triggers can be defined to count packets with matching triggers and trigger the capture buffer capture to capture packets with matching triggers. (See event based capture)

The receive trigger fields are as follows:
MSB
1
2
3
4
LSB
Byte Offset
Byte Length

11 Transmit Setup


Port 1 Configuration
File View
Port Parameters
General
Layer3
Receive Trigger Setup
Trigger 1
Trigger 2
Unshceduled Insertion Frames Setup (8
Transmit Setup
Tx Universal Settings
Scheduled Tx Streams - (8)
Stream # 1....
Stream # 2....
Stream # 3....
Stream # 4....
Stream # 5....
Stream # 6....
Stream # 7....
Stream # 8....
Transmit Universal Setting
Data
Port Test Type
Custom
Note
Fully customized
Streams Settings
Tx Mode Configuration
Tx Mode
Continuous
Schedule Mode
Inter Frame Gap
Time
96
Units
nSec
Frame Rate Bandwidth
Bandwidth
Line Rate
1000 Mbps
Payload Capacity
1000 Mbps
Frame Rate Bandwidth Calculated
Selected Bandwidth
0.0000 %
Total Aggregate Bandwidth
Total Aggregate Bit Rate
Total Aggregate Frame Rate
Random Length Length (no FCS) IPv4 Bert Errors MAC Dst MAC Src VLAN pri cfi vid Type
1 001 124 08 10 56 00 00 06 08 10 56 00 00 05 User Defined
2 002 124 08 10 56 00 00 06 08 10 56 00 00 05 1 0 0 TCPv4 192.168.001.
3 003 124 08 10 56 00 00 06 08 10 56 00 00 05 1 0 0 UDPv4 192.168.001.
4 004 124 08 10 56 00 00 06 08 10 56 00 00 05 1 0 0 IPv6 0000:0000:0
5 005 124 08 10 56 00 00 06 08 10 56 00 00 05 TCP-IPv6 0000:0000:0
6 006 124 08 10 56 00 00 06 08 10 56 00 00 05 UDP-IPv6 0000:0000:0
7 007 124 08 10 56 00 00 06 08 10 56 00 00 05 1 0 0 IPv4 192.168.001.
Default
Cancel
OK
3:07 PM



Transmit Universal Settings

Continuous Mode
Transmit a continuous stream of packets
Single Burst Mode
Transmits a single burst streams at the user-selected burst number
Multiburst Mode
Repetitive bursts with a user-adjustable delay between each burst.
Continuous Multiburst Mode
Runs multiburst mode continuously.
Packet Per Burst: Number of packets per burst.
Multi-burst Count: Number of times to burst
Inter-burst Gap: Interburst gap is the gap between bursts.

Random Frame Length
Minimum 124 bytes
Maximum 1514 bytes

Schedule Mode
Inter Frame Gap
Time: Size of gap between frames
Units: Unit of measure for gap
Frame Rate Bandwidth: Enables stream frame rate/bandwidth per stream

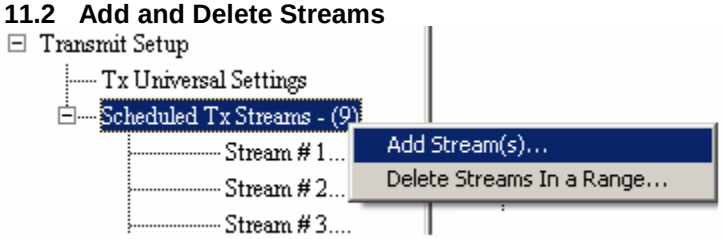
Bandwidth
Line rate: Displays the line rate settings of the selected port
Payload capacity: Displays the Payload capacity of the selected port.

Frame Rate/Bandwidth Calculated
Selected Bandwidth: Displays the actual bandwidth of the selected stream.
Total Bandwidth: Total aggregate bandwidth of all enabled streams.
Total Bit Rate: Total aggregate bit rate for of all enabled streams.
Total frame Rate: Total aggregate Frames per Second

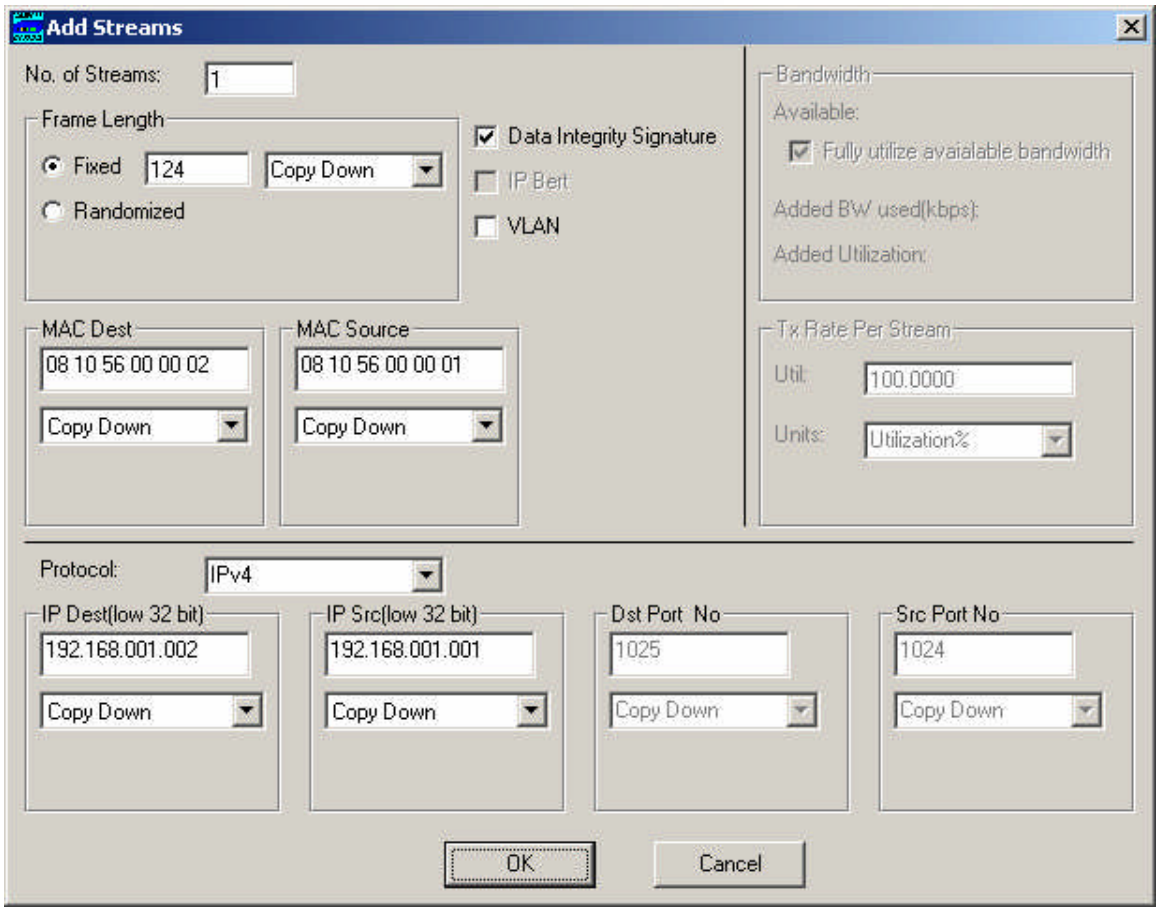
11.1 Streams and Frames

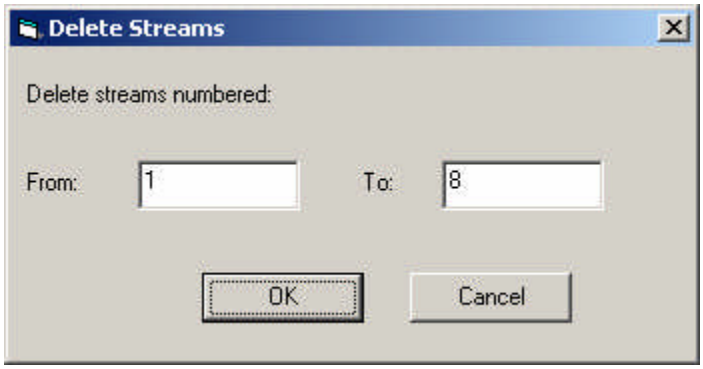
255 individual streams may be created in which you can select predefined packets and protocols such as IPv4, IPv6, or create user-defined packets with byte level definition. Specify the length and type of packet such as IPv4, IPv6, UDPv4, TCPv4, IPX, UDP-IPv6, TCP-IPv6, User Defined. Insert CRC, Symbol, alignment Errors or enable signature field to test LAN QoS testing for detailed statistics and histograms. Some protocols and Compass tests packets have reserved bytes in the packets for LAN QoS Testing, these bytes will be grayed out from editing purpose.

11.2 Add and Delete Streams



Right Click TX Streams:
Add up to 255 Streams
Delete Streams in a range



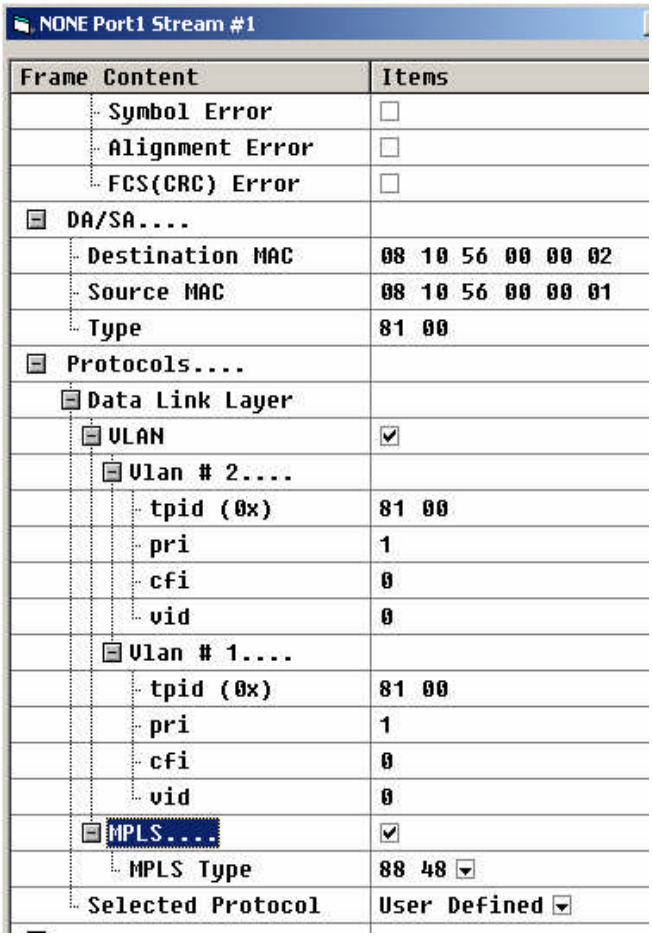


11.3 Frame Definition

- Enable/disable Stream (Click the Stream # to enable or disable from Transmit Schedule)
- Length: Specify the packet length in bytes
- Errors: checked if error insertion enabled
- Mac Source/Destination
- VLAN: pri, cfi, vid
- Type: IPv4, IPv6, UDPv4, TCPv4, IPX, UDP-IPv6, TCP-IPv6, User Defined
- Network Source/destination
- Background: Each stream has an independent 2k bytes background patter that can be user defined, or select form predefined patterns of: 1 Long word repeat, 2 Long word repeat, 3 Long word repeat, 4 Long word repeat, FFFFF's, 0000's, 5A5A, 55AA, 5555AAAAA, F0F0F0F0, FF00FF00, increment in byte, increment in word, increment in long word, decrement in byte, decrement in word, decrement in long word.
- Signature Enable: Enable/disable Signature for LAN QoS Testing, statistics and histograms.
- Data Integrity: Enable Data Integrity checking
- CRC Error: Insert CRC Error
- Symbol Error: Insert Symbol Error
- Alignment Error: Insert Alignment Error
- IP Checksum: Calculate IP Checksum
- Gateway: define streams gateway address

11.4 Frame definition- Tree View

This view allows users the ability to view the structure of the added stream and edit any of the parameters.



Frame Tree View

- Length: Specify the packet length in bytes
- Errors inserted per stream
- Select Protocol: define packet protocol
- Signature Enable: Enable/disable Signature for LAN QoS Testing, statistics and histograms.
- Data Integrity: Enable Data Integrity checking
- Mac Destination/Source
- Protocol Type: IPv4, IPv6, UDPv4, TCPv4, IPX, UDP-IPv6, TCP-IPv6, User Defined
- MPLS: Support multi-levels MPLS up to 8 levels, add and define MPLS Labels
- VLAN: Support Multi-level VLAD up to 8 levels, add and define VLAD Tags
- Background: Each stream has an independent 2k bytes

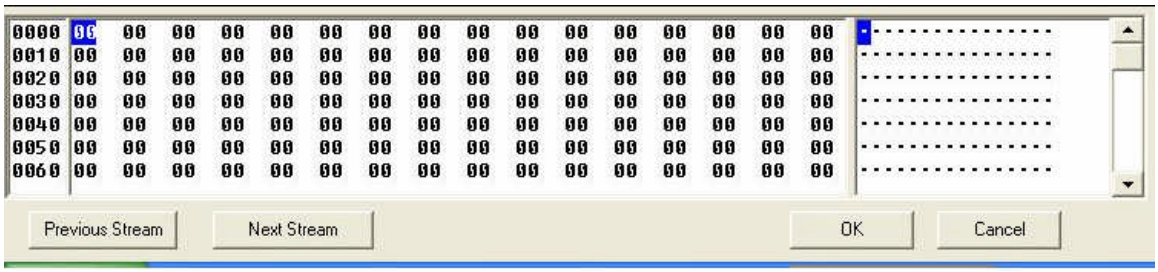
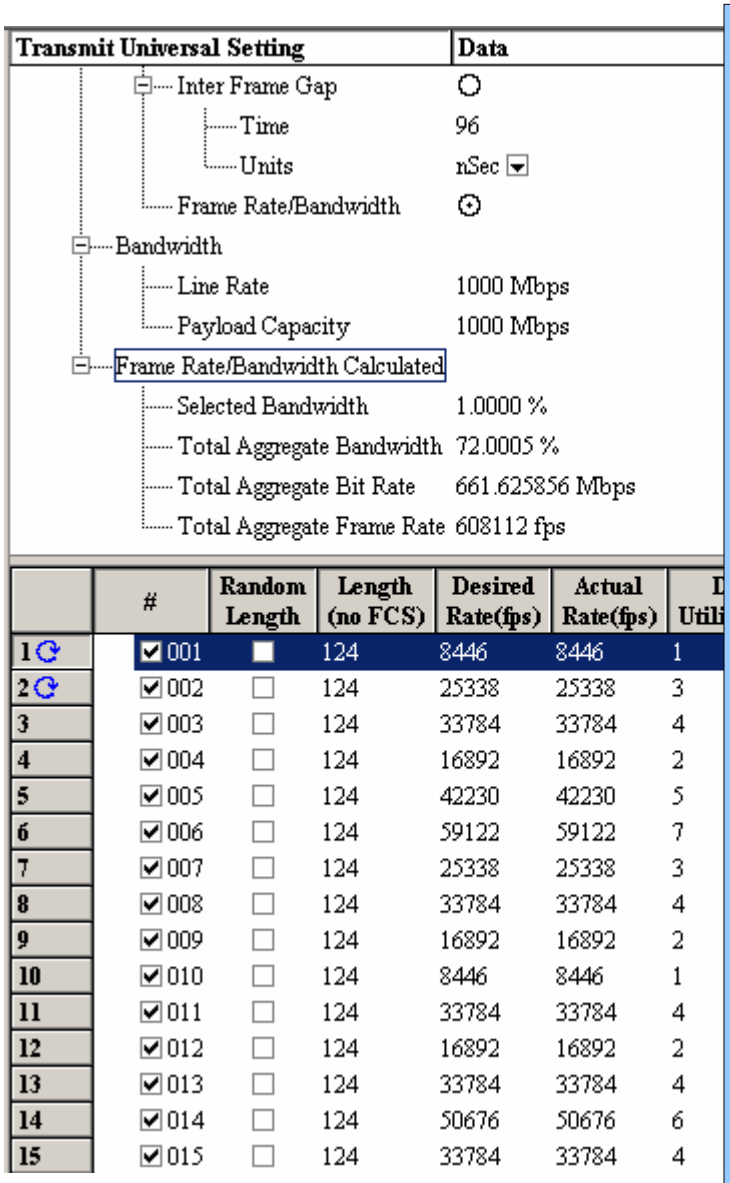


Fig Displays stream content in bytes along with the ASCII decode.

Defining Streams and Packets

1. Left Click on the port to configure
2. Click Port Configuration.
3. The Transmit Setup dialog appears
4. Set the Protocol type to Custom.
5. Click the Edit button
6. Edit the packet contents according to your needs.

11.5 Frame Rate/Bandwidth



Transmit Universal Setting	Data
Inter Frame Gap	○
Time	96
Units	nSec
Frame Rate/Bandwidth	⊙
Bandwidth	
Line Rate	1000 Mbps
Payload Capacity	1000 Mbps
Frame Rate/Bandwidth Calculated	
Selected Bandwidth	1.0000 %
Total Aggregate Bandwidth	72.0005 %
Total Aggregate Bit Rate	661.625856 Mbps
Total Aggregate Frame Rate	608112 fps

	#	Random Length	Length (no FCS)	Desired Rate(fps)	Actual Rate(fps)	D Utili
1	☑ 001	☐	124	8446	8446	1
2	☑ 002	☐	124	25338	25338	3
3	☑ 003	☐	124	33784	33784	4
4	☑ 004	☐	124	16892	16892	2
5	☑ 005	☐	124	42230	42230	5
6	☑ 006	☐	124	59122	59122	7
7	☑ 007	☐	124	25338	25338	3
8	☑ 008	☐	124	33784	33784	4
9	☑ 009	☐	124	16892	16892	2
10	☑ 010	☐	124	8446	8446	1
11	☑ 011	☐	124	33784	33784	4
12	☑ 012	☐	124	16892	16892	2
13	☑ 013	☐	124	33784	33784	4
14	☑ 014	☐	124	50676	50676	6
15	☑ 015	☐	124	33784	33784	4

Schedule Mode

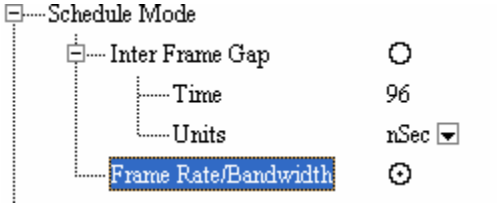
Inter Frame Gap
Time: Size of gap between frames
Units: Unit of measure for gap
Frame Rate Bandwidth: Enables stream frame rate/bandwidth per stream

Bandwidth
Line rate: Displays the line rate settings of the selected port
Payload capacity: Displays the Payload capacity of the selected port.

Frame Rate/Bandwidth Calculated
Selected Bandwidth: Displays the actual bandwidth of the selected stream.
Total Bandwidth: Total aggregate bandwidth of all enabled streams.
Total Bit Rate: Total aggregate bit rate for of all enabled streams.
Total frame Rate: Total aggregate Frames per Second of all enabled streams.
Expected Rate: Expected Frames Per Second (fps) is the desired Frames per second for the selected stream
Actual Rate: (Read Only) Displays the Actual Hardware Calculated Frames Per Second (fps)
Expected Utilization: Expected Utilization is the desired utilization for the selected stream.
Actual Utilization: (Read Only) Actual Utilization is the actual hardware calculated bandwidth utilization for the selected stream.

11.6 Transmit Setup with Frame Rate/Bandwidth per stream:

a. Under Universal Stream Settings scroll down until “Schedule Mode”
b. Select Schedule mode and check Frame Rate/Bandwidth

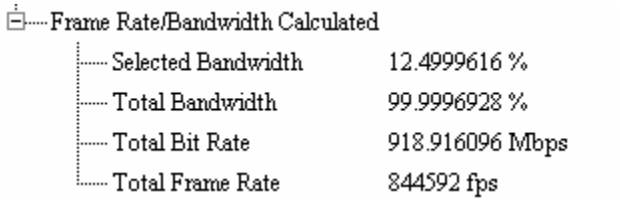


c. Click on the desired stream (to add streams right click on any stream #)

	#	Len	Expected Rate(fps)	Actual Rate(fps)	Expected Utilization(%)	Actual Utilization(%)
1	☑001	60	14881	14881	1	1.0000032
2	☑002	60	29762	29762	2	2.0000064
3	☑003	60	29762	29762	2	2.0000064

d. Enter the Expected Frames Per Second (fps) or Expected Utilization

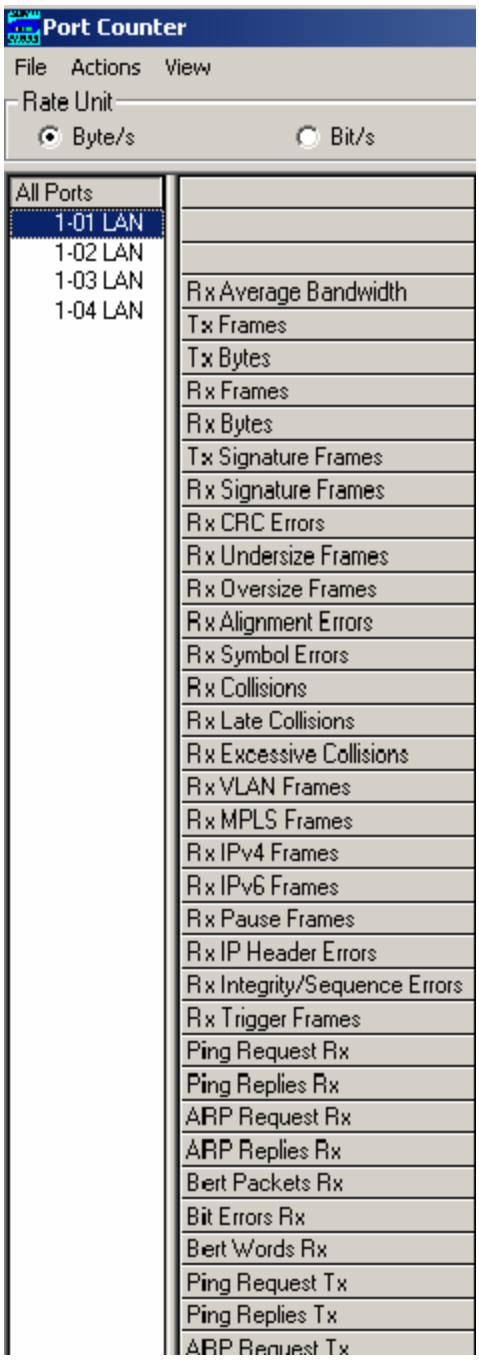
e. Note: the total bit rate and total frame rate is the aggregate of all enabled streams cannot exceed 100% bandwidth utilization


Frame Rate/Bandwidth Calculated
Selected Bandwidth 12.4999616 %
Total Bandwidth 99.9996928 %
Total Bit Rate 918.916096 Mbps
Total Frame Rate 844592 fps

f. When stream configuration is complete click “OK” to load settings to chassis.

12 Ethernet Counters

The LAN counters display an extensive tree of counters and rates for each active port selected. Click on the desired port to display counters and rates. To select multiple ports press ctrl and the left mouse button to select desired ports. To customize your view, click view and the desired format to display: To clear a counter, you can either click Actions and clear counter or just right click on the selected port in the tree and click clear.



LAN Counters

TX Average Bandwidth: Transmitted Average bandwidth.
RX Average Bandwidth: Received Average bandwidth.

TX Frames: Total Number of frames transmitted on the selected port.
TX Bytes: Total number of transmitted bytes on the selected port.
RX Frames: Total Number of frames received on the selected port.
RX Bytes: Total number of received bytes on the selected port.
RX CRC Errors: Total number of packets received with a bad CRC.
RX Undersize/Fragment: Total number of undersize frames received. (less than 64bytes)
RX Oversize Frames: Total number of packets received larger than 1518 octets.
RX Alignment Errors: Total number of alignment errors. An alignment error is a packet that does not end on the octet boundary regardless of CRC.
RX Symbol Errors: Total number of Symbol errors on selected port.
RX Collisions: Total number of alignment errors
RX Late Collisions: Total number of late collisions errors
RX Excessive Collisions: Total number of excessive errors
RX VLAN Frames: Total number of VLAN frames
RX MPLS Frames: Total number of MPLS frames
RX Jumbo Frames: Total number of jumbo frames
RX IPv4 Frames: Total number of IPv4 frames
RX IPv6 Frames: Total number of IPv6 frames
RX Pause Frames: Total number of pause frames
RX IP Header Errors: Total number of IP header errors
RX Signature Frames: Total number of Rx signature errors
Ping Requests received: Total number of Ping requests
Ping Replies Received: Total number of Ping replies
ARP requests Received: Total number of ARP requests
ARP Replies Received: Total number of ARP replies

13 Real-Time 64 LAN Flow Base QoS Counters

The CN-100 can real-time monitor and display 64 flow base LAN Rx statistics counters with total number of received frames, received frame rate and the bandwidth of each flow based on IPv4/IPv6 address, MAC source/destination address, VLAN tags, MPLS labels and DiffServ Value.

Flow types can be configured:

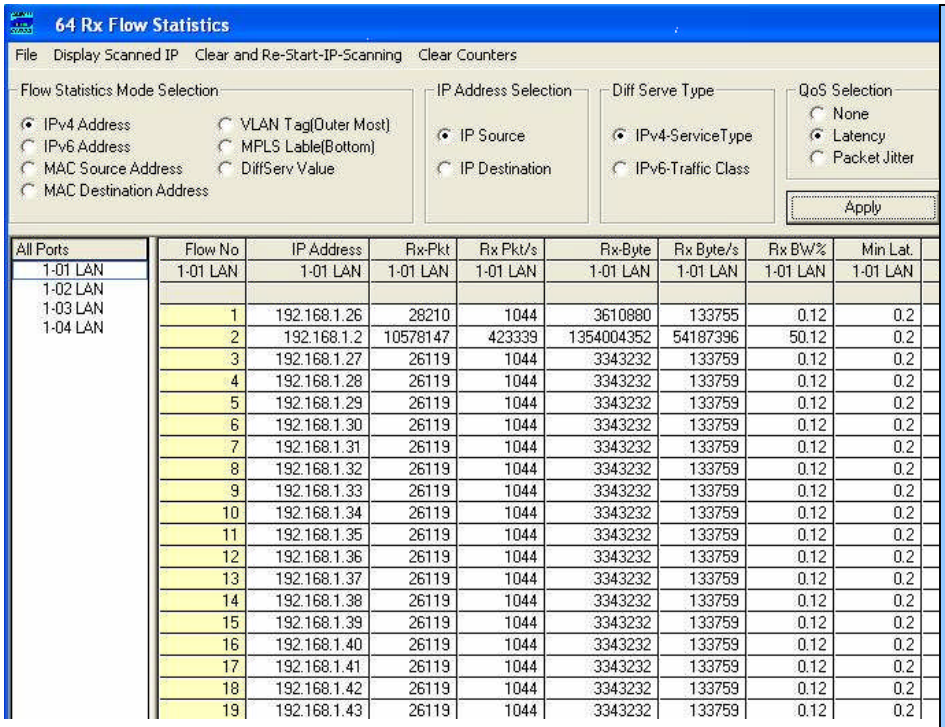
IPV4 Source Address;
IPV4 Destination Address
IPV6 Source Address;

IPV6 Destination Address
MAC Source Address;
MAC Destination Address
VLAN Tag
MPLS Lab
DiffServ Value on IPV4 Service Type
DiffeServ Value on IPV6 Traffic Class

Measurements types can be configured:

Latency (Has to be working with Cn100 test packet with signature presence)
Packet Jitter (Has to be working with Cn100 test packet with signature presence)
None (No need to be working with Cn100 test packet with signature presence)

After finished the selection configuration, click "Apply" to start the counters real time display.



Flow types can be configured:
IPV4 Source Address;
IPV4 Destination Address
IPV6 Source Address;
IPV6 Destination Address
MAC Source Address;
MAC Destination Address
VLAN Tag
MPLS Lab
DiffServ Value on IPV4 Service Type
DiffeServ Value on IPV6 Traffic Class
Measurements types can be configured:
Latency (Has to be working with signature presence)
Packet Jitter (Has to be working with signature presence)
None (No need to be working with signature presence)

Display Scanned IP: Displays up to 32 IP address and the number of frames received for each.

Clear and Re-Start IP Scanning: Clears IP addresses and scans for the first 64 IP addresses received and displays number of frames received for each.

Clear Counters: Clears Counters of the IP addresses

IP Statistics Mode Selection: IP statistics mode selects between IP Statistics and IP QoS Statistics. IP QoS Statistics for IPv4 frames with signature enabled.

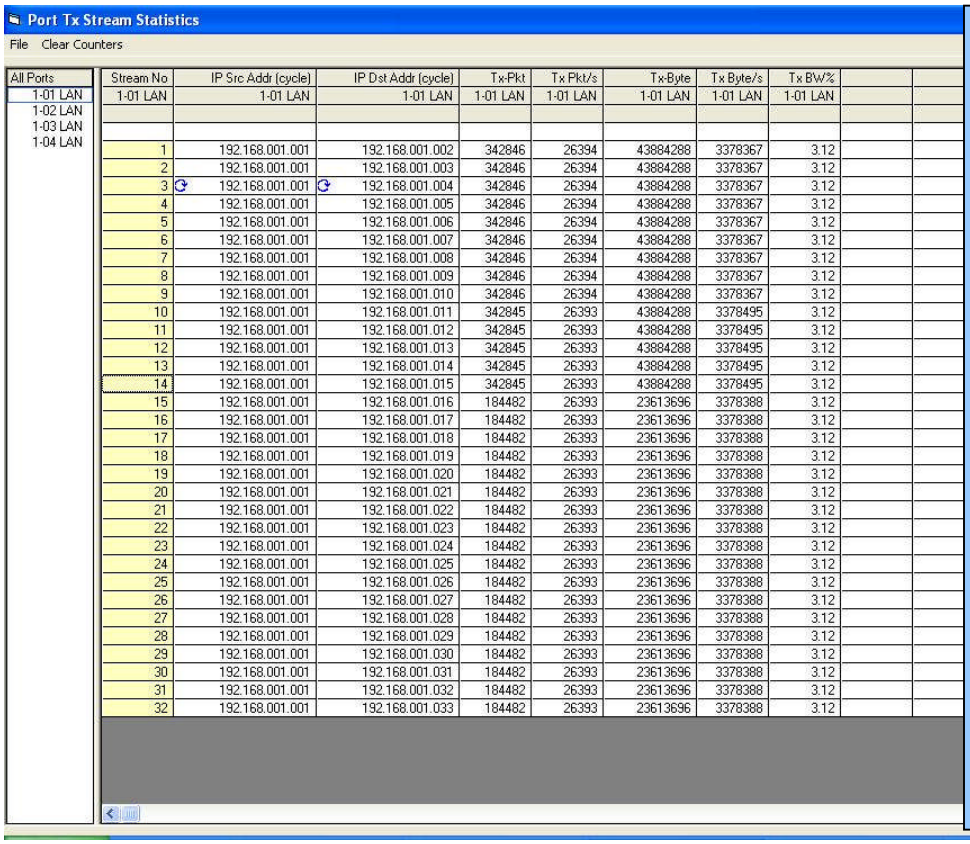
Filtered IP Address Selection: Address selection based on IP Source or IP destination.

To perform the IP scan and display counters for the IP addresses perform the following steps:

a. Select IP source or IP destination
b. Display Scanned IP

13.1 Transmit IP Counters

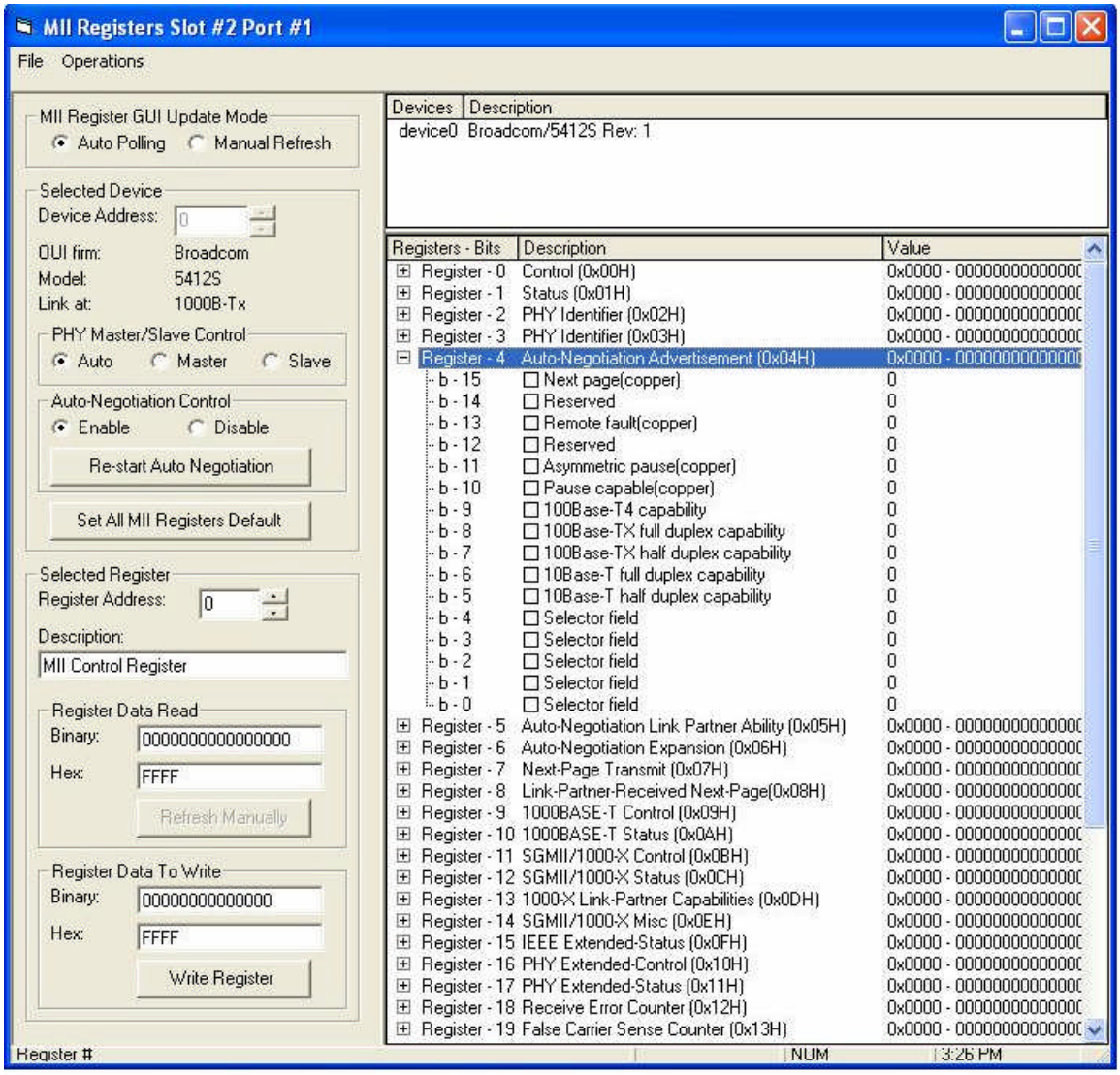
The CN-100 can real-time monitor and display LAN Transmit statistics counters with total number of transmitted frames, transmitted frame rate and the bandwidth of each transmitted stream based on IPv4/IPv6 address, MAC source/destination address.



Stream No	IP Src Addr (cycle)	IP Dst Addr (cycle)	Tx-Pkt	Tx Pkt/s	Tx-Byte	Tx Byte/s	Tx BW%
1-01 LAN	1-01 LAN	1-01 LAN	1-01 LAN	1-01 LAN	1-01 LAN	1-01 LAN	1-01 LAN
1	192.168.001.001	192.168.001.002	342846	26394	43884288	3378367	3.12
2	192.168.001.001	192.168.001.003	342846	26394	43884288	3378367	3.12
3	192.168.001.001	192.168.001.004	342846	26394	43884288	3378367	3.12
4	192.168.001.001	192.168.001.005	342846	26394	43884288	3378367	3.12
5	192.168.001.001	192.168.001.006	342846	26394	43884288	3378367	3.12
6	192.168.001.001	192.168.001.007	342846	26394	43884288	3378367	3.12
7	192.168.001.001	192.168.001.008	342846	26394	43884288	3378367	3.12
8	192.168.001.001	192.168.001.009	342846	26394	43884288	3378367	3.12
9	192.168.001.001	192.168.001.010	342846	26394	43884288	3378367	3.12
10	192.168.001.001	192.168.001.011	342845	26393	43884288	3378495	3.12
11	192.168.001.001	192.168.001.012	342845	26393	43884288	3378495	3.12
12	192.168.001.001	192.168.001.013	342845	26393	43884288	3378495	3.12
13	192.168.001.001	192.168.001.014	342845	26393	43884288	3378495	3.12
14	192.168.001.001	192.168.001.015	342845	26393	43884288	3378495	3.12
15	192.168.001.001	192.168.001.016	184482	26393	23613696	3378388	3.12
16	192.168.001.001	192.168.001.017	184482	26393	23613696	3378388	3.12
17	192.168.001.001	192.168.001.018	184482	26393	23613696	3378388	3.12
18	192.168.001.001	192.168.001.019	184482	26393	23613696	3378388	3.12
19	192.168.001.001	192.168.001.020	184482	26393	23613696	3378388	3.12
20	192.168.001.001	192.168.001.021	184482	26393	23613696	3378388	3.12
21	192.168.001.001	192.168.001.022	184482	26393	23613696	3378388	3.12
22	192.168.001.001	192.168.001.023	184482	26393	23613696	3378388	3.12
23	192.168.001.001	192.168.001.024	184482	26393	23613696	3378388	3.12
24	192.168.001.001	192.168.001.025	184482	26393	23613696	3378388	3.12
25	192.168.001.001	192.168.001.026	184482	26393	23613696	3378388	3.12
26	192.168.001.001	192.168.001.027	184482	26393	23613696	3378388	3.12
27	192.168.001.001	192.168.001.028	184482	26393	23613696	3378388	3.12
28	192.168.001.001	192.168.001.029	184482	26393	23613696	3378388	3.12
29	192.168.001.001	192.168.001.030	184482	26393	23613696	3378388	3.12
30	192.168.001.001	192.168.001.031	184482	26393	23613696	3378388	3.12
31	192.168.001.001	192.168.001.032	184482	26393	23613696	3378388	3.12
32	192.168.001.001	192.168.001.033	184482	26393	23613696	3378388	3.12

ShowOptions: MAC source and destination, IP source and destination.
TxPkt: Packets transmitted per MAC or IP address.
TxPkt/s: Transmit rate packet/sec per MAC or IP address.
TxByte/s: Transmit rate byte/sec per MAC or IP address.
Tx BW%: Transmit bandwidth per MAC or IP address.

14 MII Registers SETUP



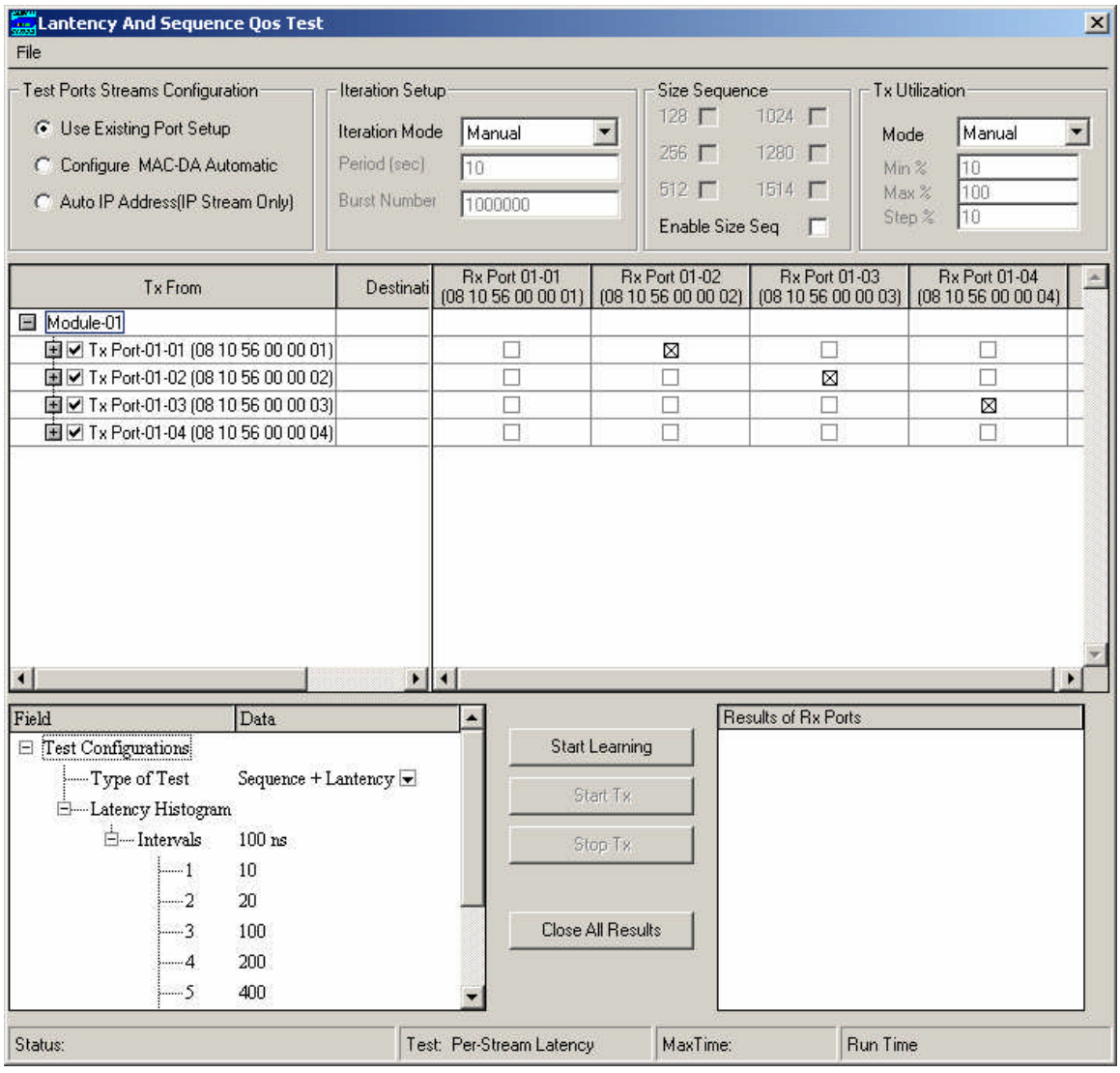
MII Registers

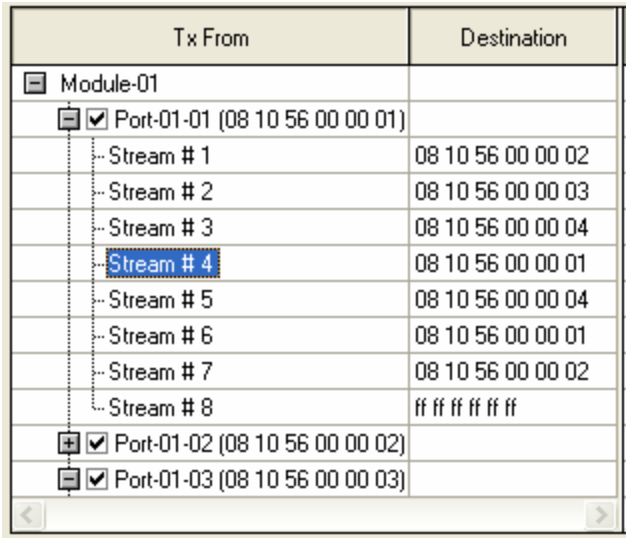
MII registers are displayed in real-time providing an accurate display of the registers and providing access to edit the registers with a click of button or enter the register manually and write the register when finished editing registers.

It is recommended that for most tests Auto-negotiation be disabled; thereby guaranteeing the test is performed in the desired rate and mode. This will allow you to test the auto-negotiation function of the DUT.

15 LAN QoS Tests

The LAN QoS Test provides an extensive set of tests with detailed statistical histograms and reporting on a per stream or multiple streams basis. For LAN QoS Tests at least one stream must be transmitted with the Compass Signature field enabled. The signature field is transmitted and received by the Compass CN-100 to provide detailed information including the sequence number, timestamp, protocol, and CRC. LAN QoS Tests places test results for a receiving port into a spreadsheet that you view from within the LAN QoS Tests window. Use the LAN QoS Test window toolbar buttons or the menu options to modify the spreadsheet format and selectively display information, similar to the way you do with traditional spreadsheet applications. The timestamp is the transmit time for a packet to a 20 ns resolution generated by the hardware.

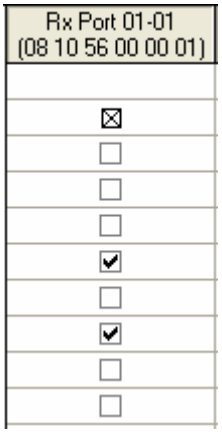




Tx From	Destination
Module-01	
Port-01-01 (08 10 56 00 00 01)	
Stream # 1	08 10 56 00 00 02
Stream # 2	08 10 56 00 00 03
Stream # 3	08 10 56 00 00 04
Stream # 4	08 10 56 00 00 01
Stream # 5	08 10 56 00 00 04
Stream # 6	08 10 56 00 00 01
Stream # 7	08 10 56 00 00 02
Stream # 8	ff ff ff ff ff ff
Port-01-02 (08 10 56 00 00 02)	
Port-01-03 (08 10 56 00 00 03)	

Latency Testing Setup
Tests may be performed on modules and ports with all active streams with data integrity Signature enabled.
Figure to the left displays

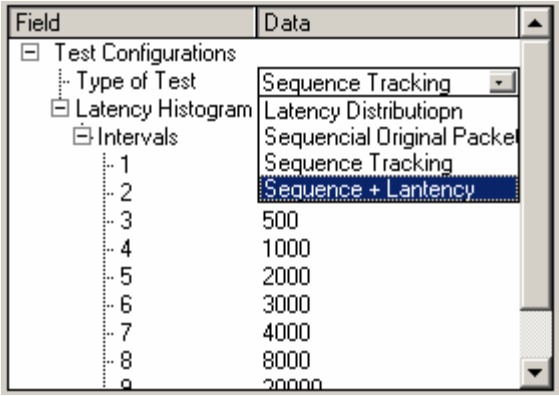
- Port-01-01 (port MAC address)
- Stream #1 (Destination Mac address)



Rx Port 01-01 (08 10 56 00 00 01)
☒
☐
☐
☐
☑
☐
☑
☐
☐

Latency Testing Setup cont…
Tests may be performed on modules and ports with all active streams with data integrity
Signature enabled.
Figure to the left displays

- A check mark assigns the destination ports MAC address to the selected stream.



LAN QoS Tests Include:
Latency Distribution
Sequential Original Packet
Sequence Tracking
Sequence + Latency

Most tests display a combination of the following results:
Stream ID: Identification of the stream transmitted from another Compass Port
Source:
Packets Tx: Total number of packets transmitted.
Packets Rx: Total number of packets received.
Lost Frames: The number of frames dropped.
Next Sequence Number: Next expected sequence number
In Sequence: Total number of packets received in sequence
Out of Sequence: Number of packets received Out of Sequence
Latency: Minimum, maximum, and average latency (time in microseconds, between time sent and time received)
Number of packets at each time interval

Latency Distribution
The Latency Distribution test checks packets to verify that packets transmitted by other Compass Ports. The Latency test is run per stream, the latency is displayed in microseconds for each stream received from each port transmitting to the receiving port results show the minimum, maximum and average, and number of packets received in each time interval.

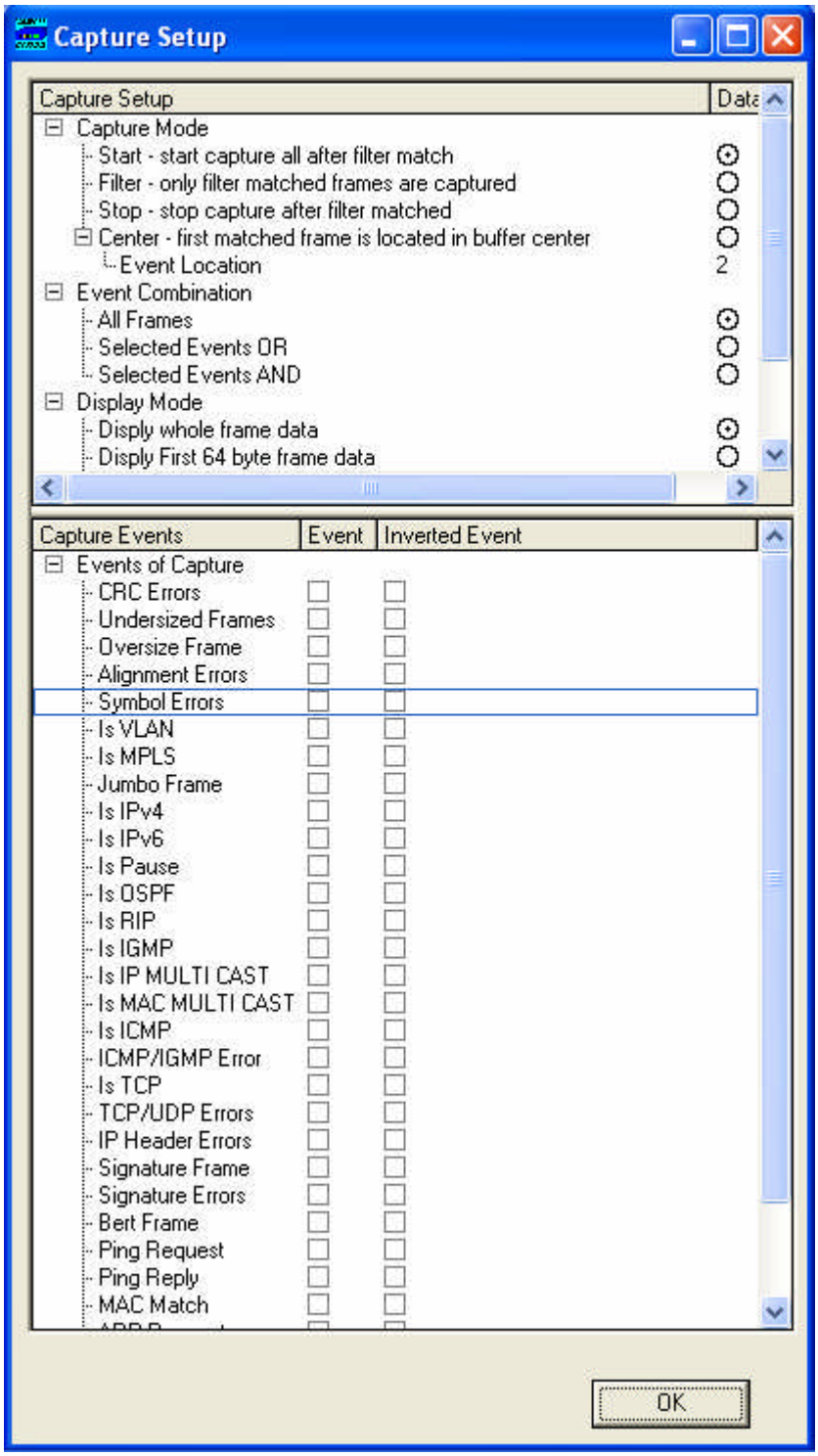
Sequence Tracking
The Sequence test checks packets to verify that packets transmitted by other Compass Ports are received correctly, whether they are received in the correct sequence, and whether there are duplicate or missing packets. The Sequence test is run per stream, the results show the Stream ID, Source, number of Transmitted Packets, number of Received Packets, Packets Lost, Next Sequence Number, Number of In Sequence packets, Number of Out of Sequence packets.

Sequence & Latency Test
The Sequence test checks packets to measure packets transmitted by other Compass Ports are received correctly, whether they are received in the correct sequence, and whether there are duplicate or missing packets. The Sequence test is run per stream, the results show the Stream ID, Source, number of transmitted packets, number of received packets, packets lost, Next Sequence Number, Number of In Sequence packets, Number of Out of Sequence packets

Sequential Original Packet Test
The Sequential Original Packet Test checks each transmitted packet transmitted by other Compass Ports and measure the time between each received packet. The packet includes Sequence number, source stream, destination stream and timestamp. Stream ID, Source, Sequence Number, Transmit Time Stamp (100ns), Receive Time Stamp (100ns resolution), Delta (Time between received packets)

16 Capture Buffer Setup

Capture Buffer Capabilities.
Each port has an independent capture buffer that can capture packets in real-time based upon a variety of triggers and filters. Select the capture mode, type of capture and event to capture. Captured data is displayed in a variety of ways. After capture begins packets are displayed in a Spreadsheet view that displays all of the packets captured with their sequence number, Protocol type, Status, Length, MAC Destination address, MAC Source address, Delta time (nSec), and data field. To view a simple decode of transmitted and captured packets you can click on a stream and view it in the Decode section that will give more detailed information on the packets contents and an ASCII decode as well. Once you have captured the data you can save it to a file as a Spreadsheet, in text format or export the data to a Sniffer or other Protocol decoder.



Capture Mode:

- Only capture frames specified in the captured events list.
- Start capturing when encounter frames specified in the Capture Events list.
- Stop capturing when encounter frames specified in the Capture Events list.

Event Combination:

- All Frames
- Selected Events OR
- Selected Events AND.

Display Mode:

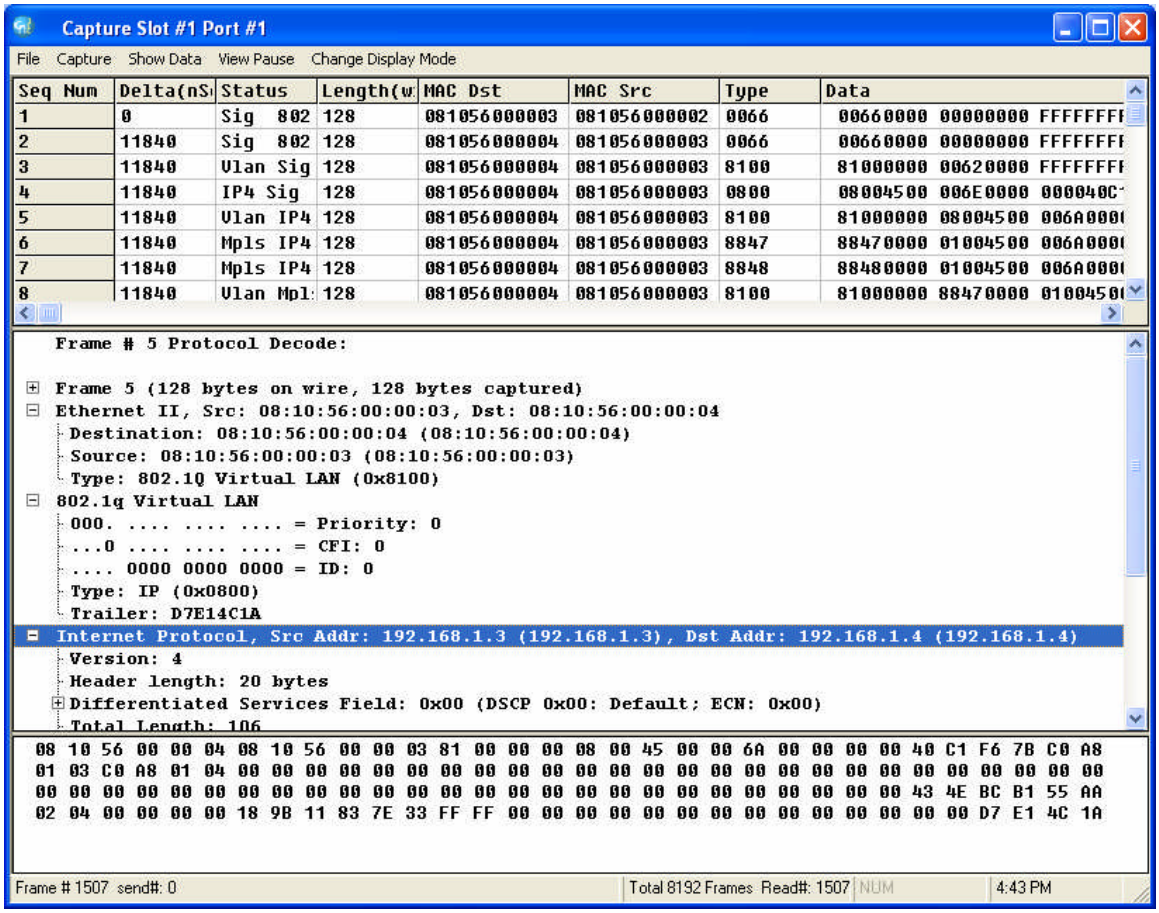
- Display whole frame data.
- Display first 64 bytes frame data.
- Display last 64 bytes frame data.

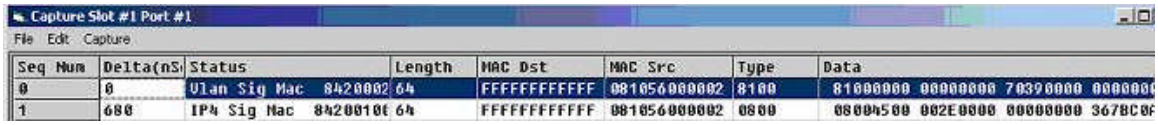
Capture Events

Capture all frames or narrow your capture with filters and triggers, perform a capture based on MAC address, or error condition.

- CRC Errors
- Undersized Frames
- Oversize Frame
- Alignment Errors
- Symbol Errors
- Is VLAN
- Is MPLS
- Jumbo Frames
- Is Ipv4
- Is Ipv6
- Is Pause
- Is ICMP
- ICMP Error
- Is TCP
- TCP Errors
- IP Header Errors
- Signature Frames
- Signature Frame
- Signature Errors
- BERT Frame
- Ping Request
- Ping Reply
- MAC Match
- ARP request
- ARP Reply
- RX Triggers
- Valid Packet

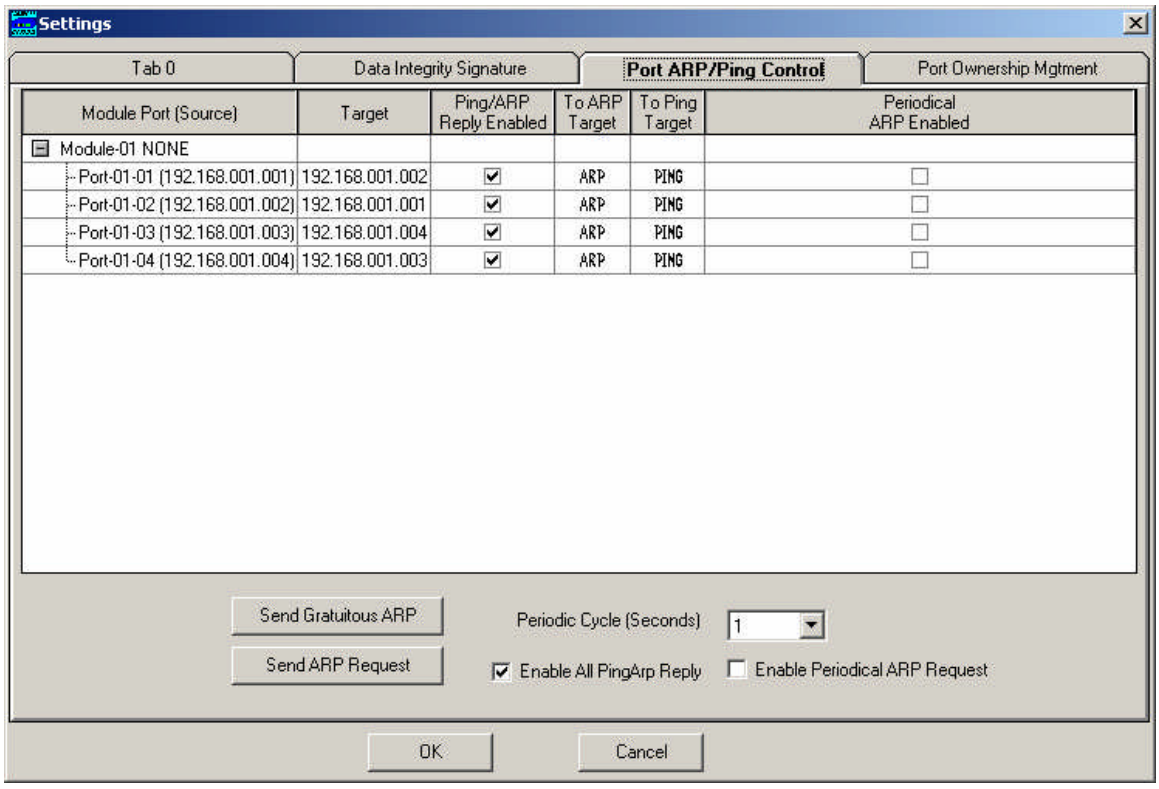
16.1 Captured and Decoded Data with - Spreadsheet View

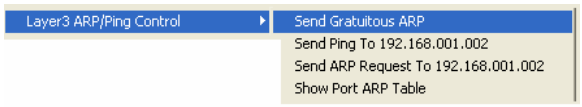



Capture Slot #1 Port #1
File Edit Capture
Seq Num | Delta(nS | Status | Length | MAC Dst | MAC Src | Type | Data
0 | 0 | Vlan Sig Mac 8420002 | 64 | FFFFFFFFFFFF | 081056000002 | 8100 | 81000000 00000000 70390000 00000000
1 | 680 | IP4 Sig Mac 842001 | 64 | FFFFFFFFFFFF | 081056000002 | 0800 | 08004500 002E0000 00000000 367BC0F

Spreadsheet View:
Sequence Number: Sequence number of packet transmitted and captured
Delta (nSec): Amount of time between when the data was transmitted and when it was received.
Status: Status displays the type of packet transmitted and captured
Length: Length of packet captured
MAC Destination address: Displays the MAC Destination address of captured packet
MAC Source address: Displays the MAC source address of captured packet.
Protocol Type: Displays the type of protocol of the captured packet.
DATA Field: The data field displays the first 64 bytes of the packet, double click on the packet to view entire packet.

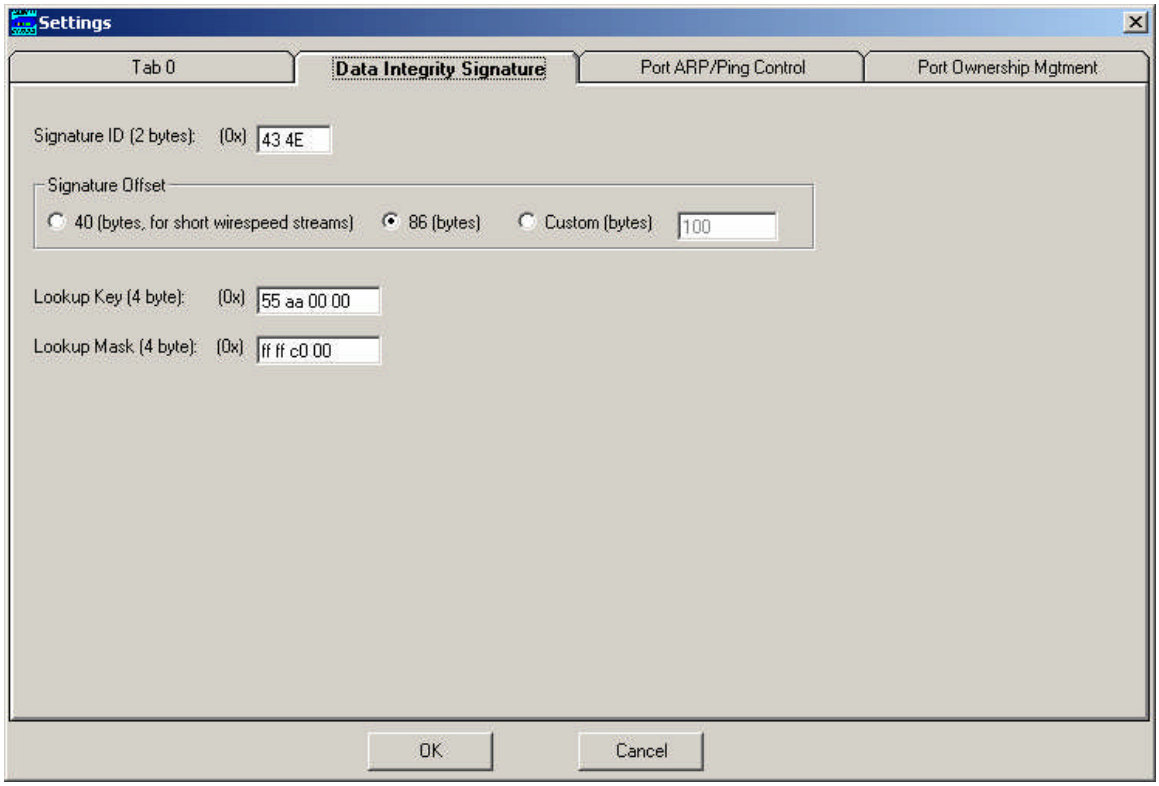
17 ARP/Ping





Configure port to send and respond to ARP and Ping requests. The Address Resolution Protocol (ARP) control is used to configure the module ports for ARP requests and replies.
ARP responses are gathered and displayed in the ARP table. This allows the port streams to be transmitted with and associated MAC address.

18 Data Integrity



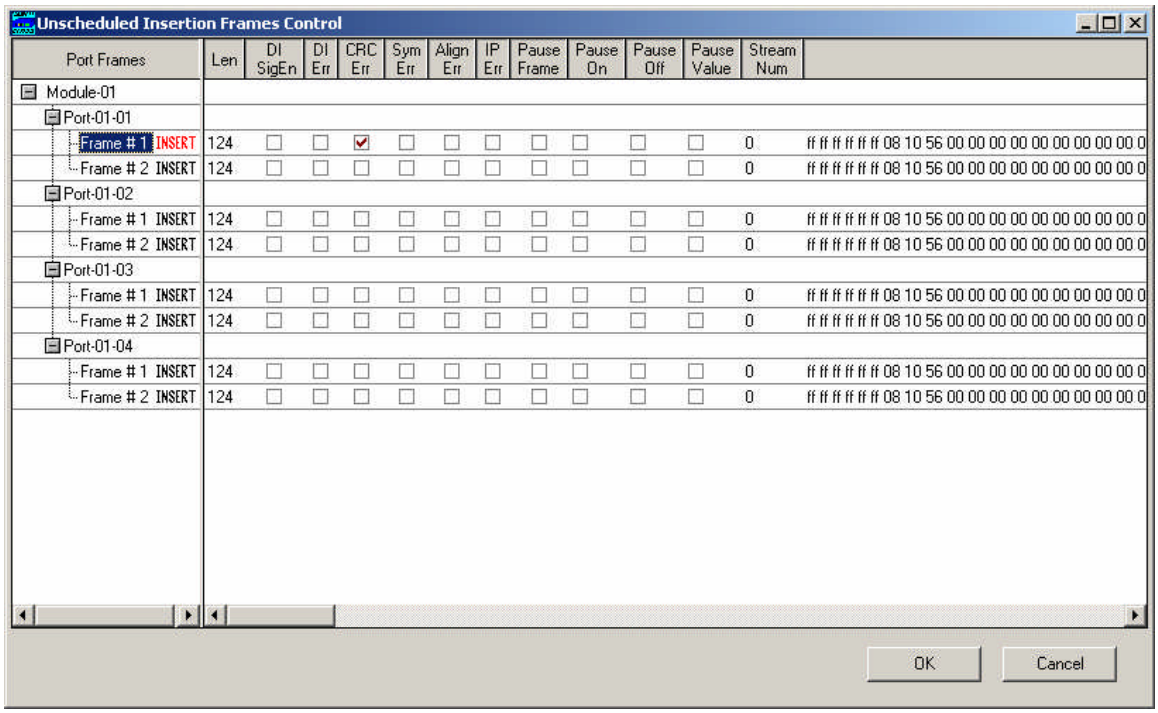
Configure ports for data integrity signatures to be assigned to transmitted packets which is used during latency testing. LAN QoS Testing
Signature ID: User defined Signature ID which allows users to define the signature to be used in QoS testing
Signature Offset: The signature offset is the offset position of the data integrity signature field in the payload.
40 byte : 40-Byte offset is used for signature testing of short packet length
96 byte: 96-Byte offset is the standard offset for the data integrity signature field
Custom: Custom offset allows the user to customize the position of the data integrity signature filed.

Receive ports check the incoming packets for data integrity errors, any incorrect checksums are counted as data integrity errors. Note: data integrity filed must be checked for streams packets to be tested.

19 Unscheduled Insertion Frame

Unscheduled Insertion Frames allows users the ability to insert frames into the regular transmit stream schedule. The insertion can be used to insert user-defined frames with varying lengths and error conditions. CRC Error, Symbol Error, Alignment Error, IP checksum Error, Pause On, Pause Off, Pause User, Number of frames to insert.

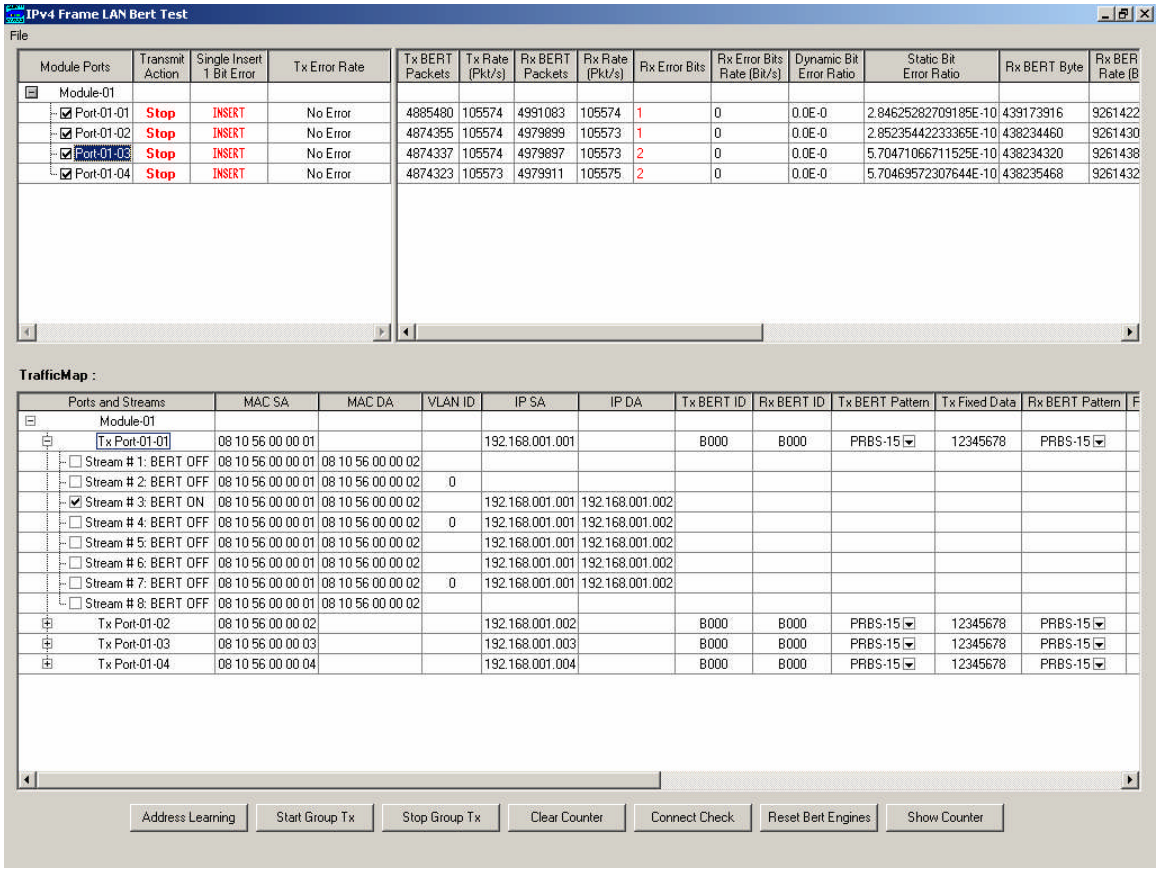
Click Insert to Insert the defined Unscheduled Frame Insertion


Unscheduled Insertion Frames Control
Port Frames
Len
DI SigEn
DI Err
CRC Err
Sym Err
Align Err
IP Err
Pause Frame
Pause On
Pause Off
Pause Value
Stream Num
Module-01
Port-01-01
Frame # 1 INSERT 124 0 ff ff ff ff ff ff 08 10 56 00 00 00 00 00 00 00 00 00 0
Frame # 2 INSERT 124 0 ff ff ff ff ff ff 08 10 56 00 00 00 00 00 00 00 00 00 0
Port-01-02
Frame # 1 INSERT 124 0 ff ff ff ff ff ff 08 10 56 00 00 00 00 00 00 00 00 00 0
Frame # 2 INSERT 124 0 ff ff ff ff ff ff 08 10 56 00 00 00 00 00 00 00 00 00 0
Port-01-03
Frame # 1 INSERT 124 0 ff ff ff ff ff ff 08 10 56 00 00 00 00 00 00 00 00 00 0
Frame # 2 INSERT 124 0 ff ff ff ff ff ff 08 10 56 00 00 00 00 00 00 00 00 00 0
Port-01-04
Frame # 1 INSERT 124 0 ff ff ff ff ff ff 08 10 56 00 00 00 00 00 00 00 00 00 0
Frame # 2 INSERT 124 0 ff ff ff ff ff ff 08 10 56 00 00 00 00 00 00 00 00 00 0
OK
Cancel

LAN BERT TEST

20 Bit Error Rate Test Overview

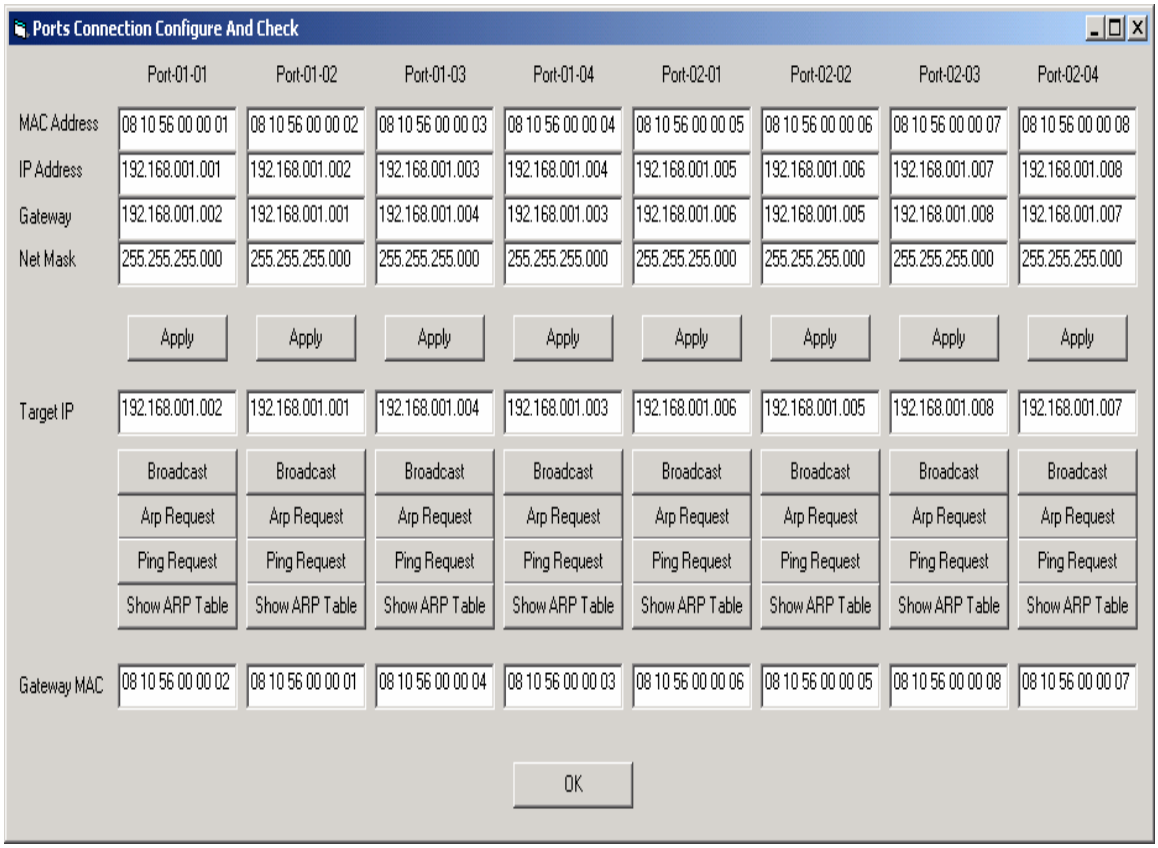
The following BERT (Bit Error Rate Test) are designed to provide tests that users can use to measure and report the performance characteristics of the network device. The CN-100 BERT test provides a comprehensive test that can measure Bit Errors and can induce a known number of bit error's to see how the DUT/SUT reacts to errors.



21 Ports Connection Configuration

The following instructions define how to configure the test port connections of the CN-100 for the BERT test. The user may configure the test ports MAC Address, IP address, and Gateway.

In Tests menu click on Connection Configuration and Check:



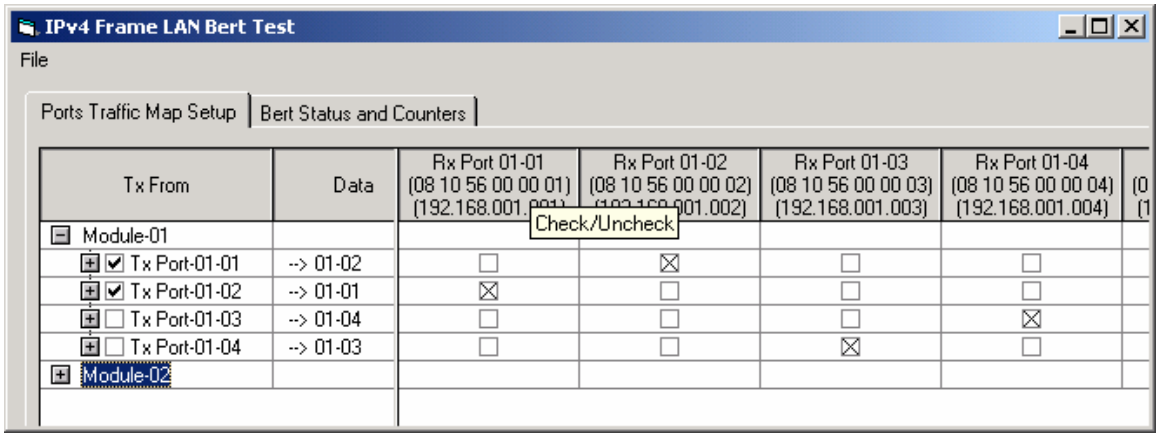
Edit each of following port IP configuration items based on test connection:

MAC Address: Set tester port MAC source, if it has not conflict with other existing node, no need to change its default value.
IP Address: Set tester port IP source, it should be modified to make sure it is in the same subnet and no conflict with other existing node.
Gateway: Set customer gateway IP address, it is connected to the tester port directly. If there is no gateway, use the expected destination IP (in same subnet).
After above setup is completed on all tester ports, click button "Apply" for each port so that the modified setup will be loaded into tester module.
Target IP: If there is a gateway, set it same as gateway at first.
After all gateways have been copied as target IP, click "Broadcast", then "ARP", then "Ping". If ping is successful, click "Show ARP Table", then the gateway MAC address will be automatically copied into "Gateway MAC" box. If ping is not successful, you should check and correct the related port configuration until pinging success.
Changes target IP to each of the expected destinations regardless if they are in the same subnet or not. Ping each new target to check if each of them is reachable.
After all the expected connections are verified to be working, start next step.

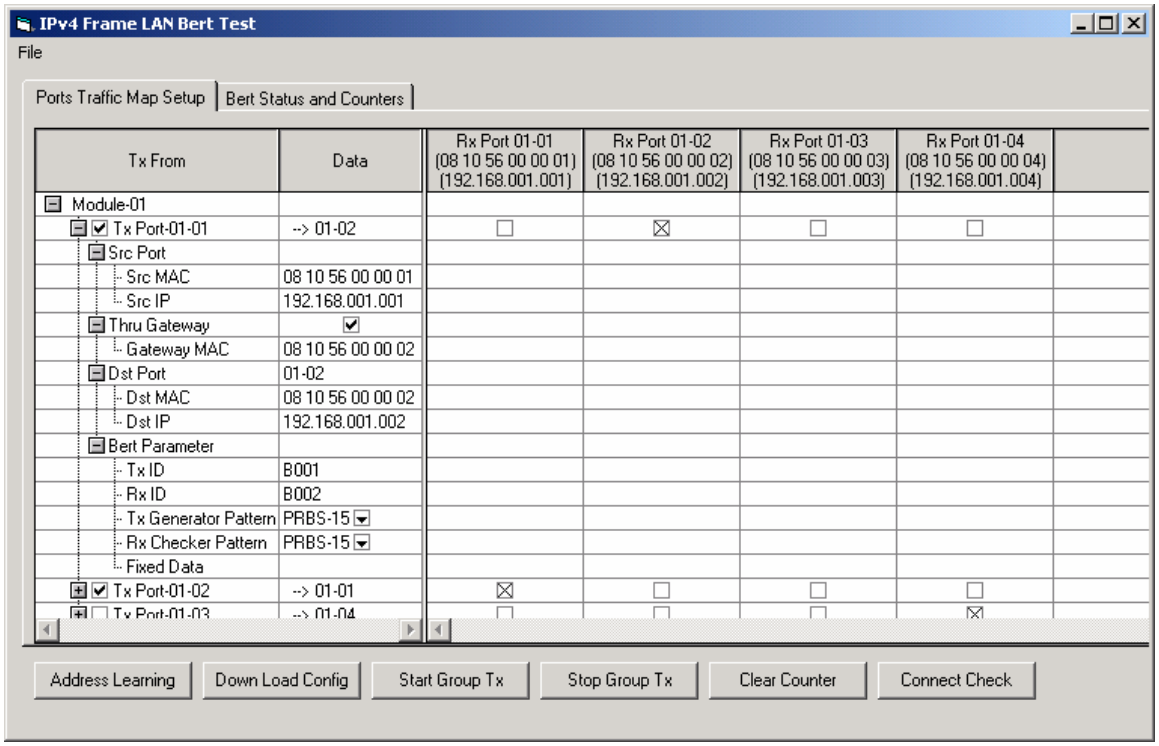
22 BERT Test Setup

The port BERT parameters tab allows the user to define the transmit and receive BERT pattern and inserted error rate if desired. The TX ID and RX ID, TX and RX pattern of the ports must match desired configuration to function correctly.

In “IPv4 Frame LAN Bert Test window”, select “Port Traffic Map Setup”,
in the TxPort row click on the expected RxPort column, so that cross section check box is activated, a TX to RX direction is configured.



To make sure the expected path is configured with correct address you need to expand TxPort setup like bellow:


IPv4 Frame LAN Bert Test
File
Ports Traffic Map Setup
Bert Status and Counters
Tx From
Data
Rx Port 01-01 (08 10 56 00 00 01) (192.168.001.001)
Rx Port 01-02 (08 10 56 00 00 02) (192.168.001.002)
Rx Port 01-03 (08 10 56 00 00 03) (192.168.001.003)
Rx Port 01-04 (08 10 56 00 00 04) (192.168.001.004)
Module-01
Tx Port-01-01 --> 01-02
Src Port
Src MAC 08 10 56 00 00 01
Src IP 192.168.001.001
Thru Gateway
Gateway MAC 08 10 56 00 00 02
Dst Port 01-02
Dst MAC 08 10 56 00 00 02
Dst IP 192.168.001.002
Bert Parameter
Tx ID B001
Rx ID B002
Tx Generator Pattern PRBS-15
Rx Checker Pattern PRBS-15
Fixed Data
Tx Port-01-02 --> 01-01
Address Learning
Down Load Config
Start Group Tx
Stop Group Tx
Clear Counter
Connect Check

To make sure the transmitting Bert frame can be recognized by the expected RX port, the following items must match:

Dst IP should be equal to Rx Port Src IP
Dst MAC should be equal to Rx Port Src MAC if they are in the same subnet, if not the "Thru Gateway" item should be checked so that the gateway MAC will be used in the on going frame as its destination MAC. RxID on target RxPort should be equal to the TxID on the source TxPort. In general, the above configurations should be done by GUI automatically. However, user should make further verification; the user is able to do further modifications to make his own customized setup.

BERT pattern (e.g. PRBS – 15) must match between Tx and Rx ports.

A double click is needed to make the expected item modified.

When port settings are completed, click "Down Load Config".

23 Port Configuration

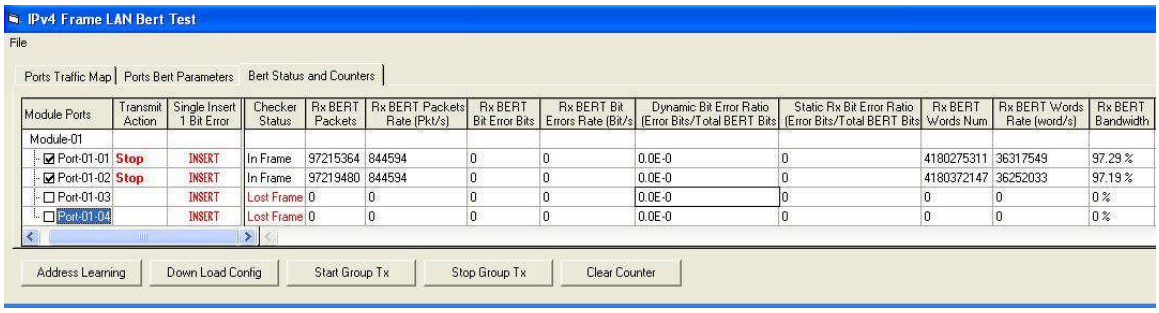
The following instructions define how to configure the port mapping of the CN-100 for the BERT test. The user may define the port parameters including MAC address, IP address and each individual IPv4 streams to be used in the IPv4 BERT test.

Transmit Universal Setting	Data
Port Test Type	LAN Bert
Note	Bert for IPv4 stream only, signature has to be disabled,
Dest MAC Addr	08 10 56 00 00 02
Dest IPv4 Addr	192.168.001.002
Tx ID	B001
Rx ID	B002
Tx Generator Pattern	PRBS-15
Rx Checker Pattern	PRBS-15
Tx Error Rate	No Error
Streams Settings	
Tx Mode Configuration	
Tx Mode	Continuous
Schedule Mode	

	#	Random Length	Length (no FCS)	IPv4 Bert	Errors	MAC Dst	MAC Src
1	001		124			08 10 56 00 00 02	08 10 56 00 00 01
2	002		124			08 10 56 00 00 02	08 10 56 00 00 01
3	003		124			08 10 56 00 00 02	08 10 56 00 00 01
4	004		124			08 10 56 00 00 02	08 10 56 00 00 01
5	005		124			08 10 56 00 00 02	08 10 56 00 00 01

1. Select Port Configuration
2. Set Port Test Type to LAN BERT
3. Delete Existing streams or edit them.
4. Select Port 1 Configuration
5. Set Port Test Type to LAN BERT
6. Define Port MAC Address
7. Define Port IP Address
8. Set Streams to IPv4 type, click IPv4 BERT.
    a. If streams already exist change stream type to IPv4 or Add new IPv4 streams, set to IPv4 BERT
9. There are two ways can be used to configure traffic bandwidth:
    a. Set in-frame gap. (Default mode) Click on "Transmit Setup" in left panel. In right top panel, move items down then find out "Stream Settings". Under "Schedule Mode" select "Inter Frame Gap", then modify Time value to the expected gap length.
    b. Configure with bandwidth utilization Under "Schedule Mode" select "Frame Rate/Bandwidth", then go into right Bottom box (see bellow picture). In "Desired Utilization (%)" field enter the Expected number (e.g. 0.1).
10. Click "OK"

24 BERT Status and Counters


IPv4 Frame LAN Bert Test
File
Ports Traffic Map
Ports Bert Parameters
Bert Status and Counters
Module Ports
Transmit Action
Single Insert 1 Bit Error
Checker Status
Rx BERT Packets
Rx BERT Packets Rate (Pkt/s)
Rx BERT Bit Error Bits
Rx BERT Bit Errors Rate (Bit/s)
Dynamic Bit Error Ratio (Error Bits/Total BERT Bits)
Static Rx Bit Error Ratio (Error Bits/Total BERT Bits)
Rx BERT Words Num
Rx BERT Words Rate (word/s)
Rx BERT Bandwidth
Module-01
Port-01-01 Stop INSERT In Frame 97215364 844594 0 0 0.0E-0 0 4180275311 36317549 97.29 %
Port-01-02 Stop INSERT In Frame 97219480 844594 0 0 0.0E-0 0 4180372147 36252033 97.19 %
Port-01-03 INSERT Lost Frame 0 0 0 0 0.0E-0 0 0 0 0 %
Port-01-04 INSERT Lost Frame 0 0 0 0 0.0E-0 0 0 0 0 %
Address Learning
Down Load Config
Start Group Tx
Stop Group Tx
Clear Counter

The BERT status and counters is used to perform address learning, download confirmation, start/stop ports or groups of ports and display the following information:
Status: In frame or loss of frame.
RX Packets: Total number of Received BERT Packets.
RX Packets Rate: Current Rate of Received BERT Packets in packets per second.
RX Bit Errors: Total received bit errors.
RX Bit Errors Rate: Rate of received bit errors.
Dynamic Bit Error Ratio: Error Bits/Total BERT frame bits. The dynamic bit error ratio is equal to bit-err-rate/total-PRBS-bit-rate.

Static RX Bit Error Ratio: Error Bits/Total BERT Bits The static bit error ratio is equal to total-bit-err/total-PRBS-bit.

RX BERT Words: Total Received BERT words. The "Rx Bert Word" is measured in unit of word (16 bit/word), to convert it to bit you need to multiply it by 16.

RX BERT bandwidth: Receive BERT packets Bandwidth.

Transmit Action: Start/Stop selected port.
Insert: Inserts single Bit error.

TX error Rate: Insert bit error with a fixed rate (e.g., 1.0 0E -6) double click on Tx Error Rate combo list box.
Download Config: Download Current BERT parameters to CN-100.
Start group Tx: Starts transmitting allow ports.
Stop Group Tx: Stop transmitting allow ports.
Clear Counters: Clears counters.

The counter item of "Rx Bert Word" is measured with unit of word (16 bit/word), to convert it to bit you need multiply it by 16.

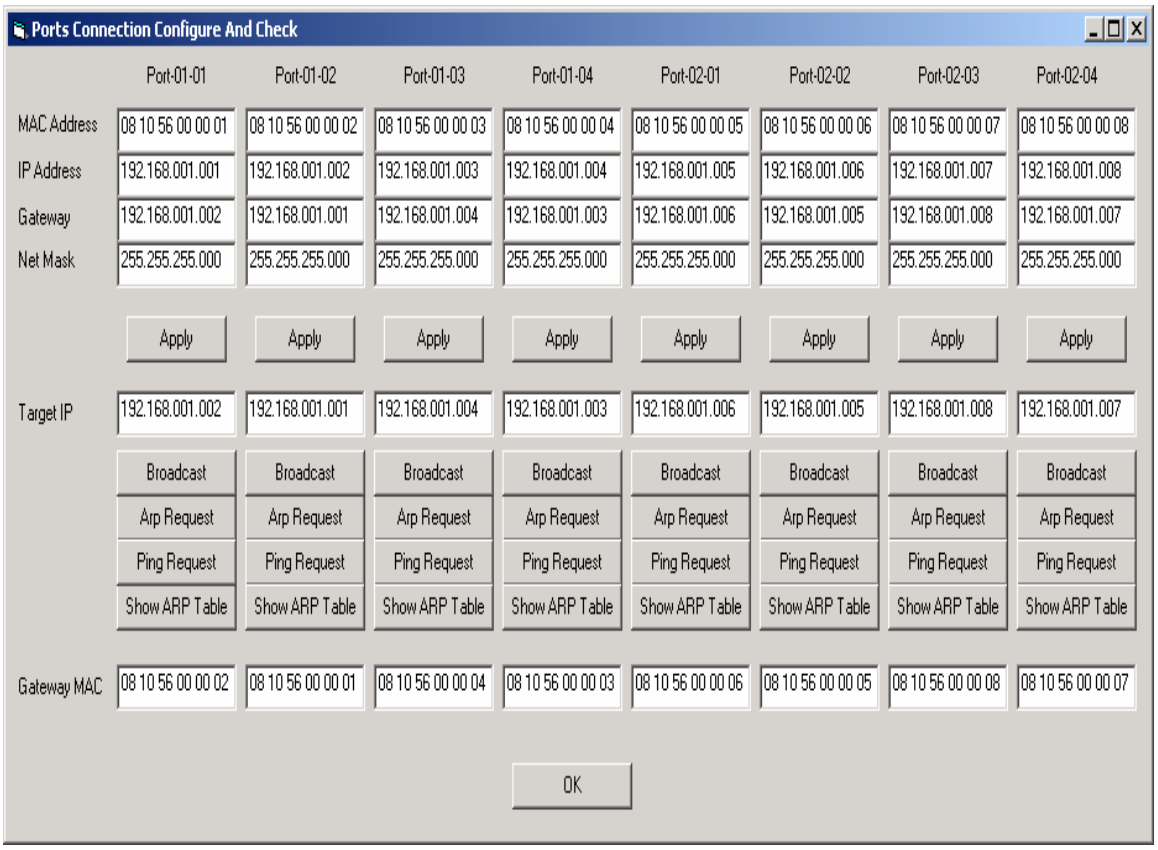
The Rx Bert Bandwidth is measured based on the received PRBS filed bit length (Rx Bert Word) only, remaining fields of the received Bert frame, such as MAC, IP header, …, are not included. To increase BERT frame bandwidth closer to 100%, you need to use a larger frame size.

25 Ethernet Bit Error Rate Test Tutorial #1

This tutorial will walk you through the basic configuration of a Bit Error Rate Test. The test will transmit traffic from the test source port through the system under test (SUT) or device under test (DUT). Please configure the DUT/SUT so the traffic will be forwarded to the receive test ports. Each available test port should be connected to the DUT/SUT with the appropriate cable for the DUT/SUT ports.

Once you have established a connection between the CN-100 Manager Software and the CN-100 chassis you want to use for the test please follow the following steps.

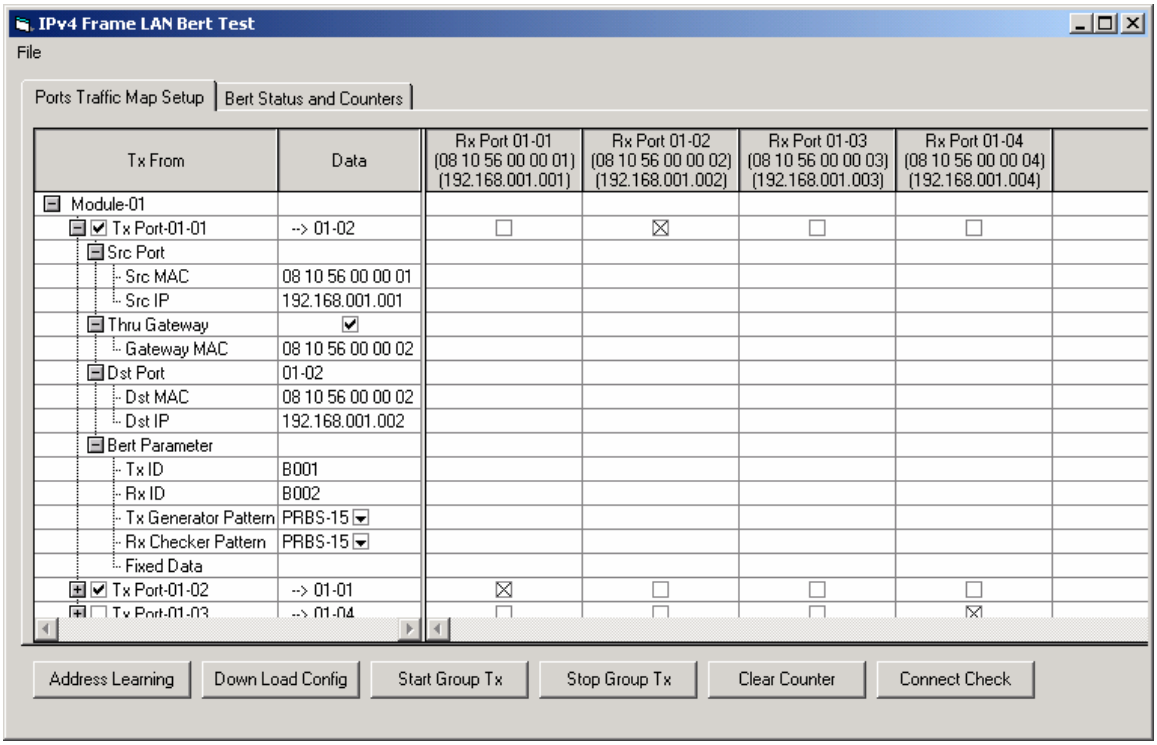
1. Boot Up Chassis and connect appropriate Ethernet Management Cable or Serial cable on the back of the chassis.
2. Launch CN-100 Manager GUI.
3. Connect to the Chassis, a connection can be verified by the status bar on the bottom left corner of the CN-100 Manager GUI.
4. Install a patch cord to connect the desired test ports. (with the cables connected a green link LED should be seen on each of the connected ports)
5. Click Tests, "Connection Configure and Check"



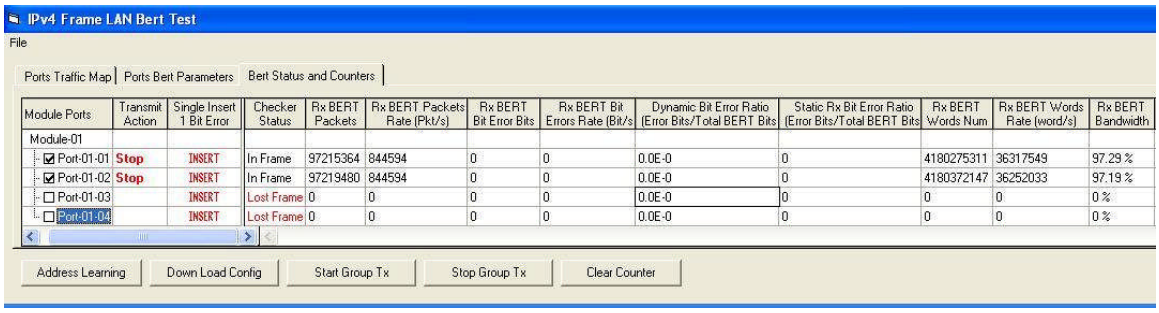
6. Define MAC Address: Set tester port MAC source, if it has not conflict with other existing node, no need to change its default value.
7. IP Address: Set tester port IP source, it should be modified to make sure it is in the same subnet and no conflict with other existing node.
8. Gateway: Set customer gateway IP address, it is connected to the tester port directly. If there is no gateway, use the expected destination IP (in same subnet).
9. After above setup is completed on all tester ports, click button "Apply" for each port so that the modified setup will be loaded into tester module.
10. Target IP: If there is a gateway, set it same as gateway at first.
11. After all gateways have been copied as target IP, click "Broadcast", then "ARP", then "Ping". If ping is successful, click "Show ARP Table", then the gateway MAC address will be automatically copied into "Gateway MAC" box. If ping is not successful, you should check and correct the related port configuration until pinging success.
12. Change target IP to each of the expected destinations regardless if they are in the same subnet or not. Ping each new target to check if each of them is reachable.
13. After all the expected connections are verified to be working, click "OK"
14. From the main CN-100 Manager screen please click "tests", select LAN IPv4 Frame BERT
15. Select "Port Traffic Map Setup", in the TxPort row click on the expected Rx Port column, so that cross section check box is activated, a TX to RX direction is configured.
16. Set Port Test Type to LAN BERT
17. Set Streams to IPv4 type, click IPv4 BERT.
    a. If streams already exist change stream type to IPv4 or
    b. Add new IPv4 streams, set to IPv4 BERT

	#	Random Length	Length (no FCS)	IPv4 Bert	Errors	MAC Dst	MAC Src	VLAN	pri	cfi	vid	Type
1	☑ 001	☐	124	☑		08 10 56 00 00 02	08 10 56 00 00 01	☐				IPv4
2	☑ 002	☐	124	☑		08 10 56 00 00 02	08 10 56 00 00 01	☐				IPv4

18. Define stream MAC Address
19. Define stream IP Address
20. Click “OK”



21. Define Port BERT Parameters including ID, PRBS pattern, error rate. Transmit and receive ports must match.
22. Click “Down Load Configuration”
23. Click “Start Group TX”
24. BERT Status displays the counts and rates of the BERT test.


IPv4 Frame LAN Bert Test
File
Ports Traffic Map
Ports Bert Parameters
Bert Status and Counters
Module Ports
Transmit Action
Single Insert 1 Bit Error
Checker Status
Rx BERT Packets
Rx BERT Packets Rate (Pkt/s)
Rx BERT Bit Error Bits
Rx BERT Bit Errors Rate (Bit/s)
Dynamic Bit Error Ratio (Error Bits/Total BERT Bits)
Static Rx Bit Error Ratio (Error Bits/Total BERT Bits)
Rx BERT Words Num
Rx BERT Words Rate (word/s)
Rx BERT Bandwidth
Module-01
Port-01-01 Stop INSERT In Frame 97215364 844594 0 0 0.0E-0 0 4180275311 36317549 97.29 %
Port-01-02 Stop INSERT In Frame 97219480 844594 0 0 0.0E-0 0 4180372147 36252033 97.19 %
Port-01-03 INSERT Lost Frame 0 0 0 0 0.0E-0 0 0 0 0 %
Port-01-04 INSERT Lost Frame 0 0 0 0 0.0E-0 0 0 0 0 %
Address Learning
Down Load Config
Start Group Tx
Stop Group Tx
Clear Counter

25. To insert Single Bit Error click “insert”
26. To change test parameters the test must be stopped first, than load new configuration prior to starting new test.

26 RFC2544 Test Overview

The following RFC2544 Benchmarking Methodology tests are designed to provide a specific set of tests that vendors could use to measure and report the performance characteristics of the network device. The results of each test will be provided in the form of a test log and corresponding graphs. The four RFC2544 tests are easily configured and run using the RFC2544 test application. The four tests include:

Throughput Test: Finds the rate at which all transmitted packets are forwarded with zero loss by the system under test. (RFC2544 26.1)

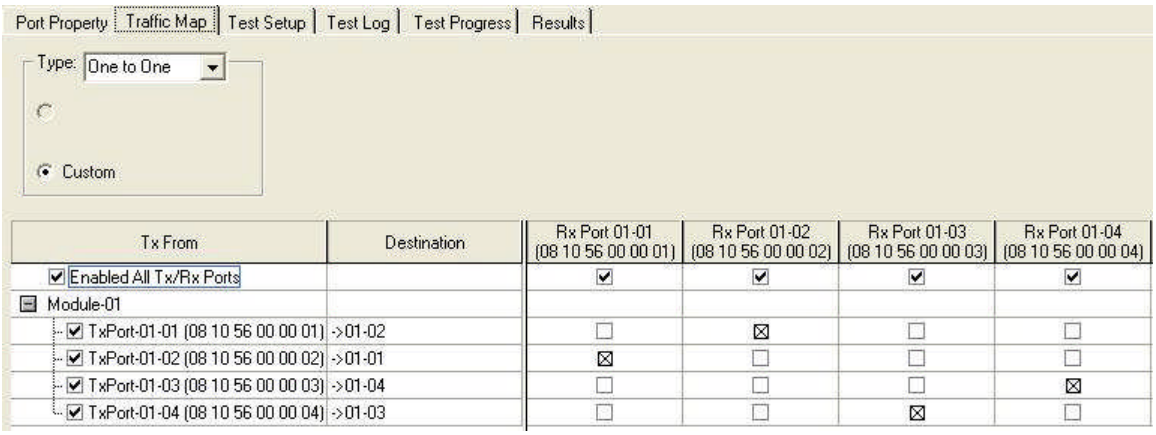
Latency: Measure the Minimum, Maximum and Average Latency of various frame sizes at the zero loss rate determined by the throughput test. (RFC2544 26.2)

Frame Loss Test: Measure the packet loss at various input data rates and frame sizes. (RFC2544 26.3)

Back-to-Back Test: (Burst Length Test) Finds the longest burst length with minimum frame gap the system under test can sustain without losing any frames. (RFC2544 26.4)

27 Traffic Mapping

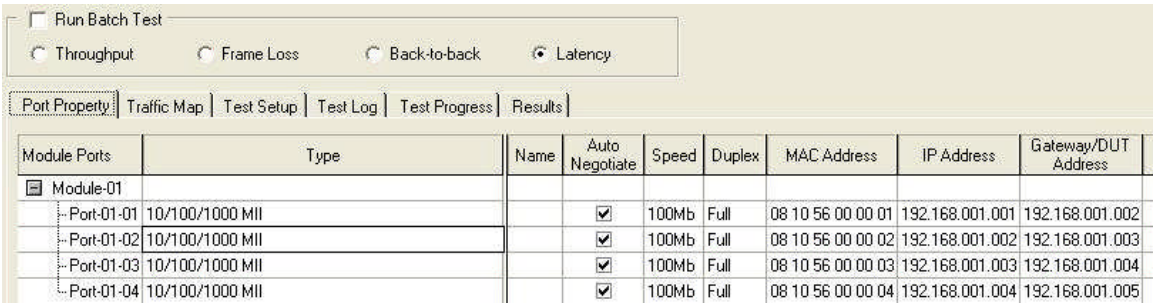
The following instructions define how to configure the port mapping of the CN-100 for the RFC2544 test. The user may select a variety of mapping configurations or manually select the test source and destination ports. Configure the DUT/SUT so the traffic from the source test port is forwarded to the destination test port. The test ports may be configured one to one test, user defined or fully meshed.


Port Property
Traffic Map
Test Setup
Test Log
Test Progress
Results
Type:
One to One
Custom
Tx From
Destination
Rx Port 01-01 (08 10 56 00 00 01)
Rx Port 01-02 (08 10 56 00 00 02)
Rx Port 01-03 (08 10 56 00 00 03)
Rx Port 01-04 (08 10 56 00 00 04)
Enabled All Tx/Rx Ports
Module-01
TxPort-01-01 (08 10 56 00 00 01) ->01-02
TxPort-01-02 (08 10 56 00 00 02) ->01-01
TxPort-01-03 (08 10 56 00 00 03) ->01-04
TxPort-01-04 (08 10 56 00 00 04) ->01-03

One to One: Transmits traffic form one source test port to one destination port.
One to Many: Transmits traffic from One source test port to Multiple Destination test ports.
Many to One: Transmits traffic from multiple test ports to one destination test ports.
Many to Many: Transmits traffic from multiple tests ports to multiple destination test ports.

28 Port Property

The port property tab allows the user to define the MAC Address, IP address and gateway/DUT address. Auto-negotiate, Port Speed Duplex/Half Duplex is defined prior to opening the RFC2544 test application. The CN-100 will autonegotiate the speed and duplex of the each test port. (to manually set the speed/duplex of the test ports you need to close the RFC2544 test and from the Main Manager Screen left-click on each port to set the speed/duplex and then reopen the RFC2544 test)



Module Ports	Type	Name	Auto Negotiate	Speed	Duplex	MAC Address	IP Address	Gateway/DUT Address
Module-01								
Port-01-01	10/100/1000 MII		☑	100Mb	Full	08 10 56 00 00 01	192.168.001.001	192.168.001.002
Port-01-02	10/100/1000 MII		☑	100Mb	Full	08 10 56 00 00 02	192.168.001.002	192.168.001.003
Port-01-03	10/100/1000 MII		☑	100Mb	Full	08 10 56 00 00 03	192.168.001.003	192.168.001.004
Port-01-04	10/100/1000 MII		☑	100Mb	Full	08 10 56 00 00 04	192.168.001.004	192.168.001.005

29 Test Setup

The test setup screen is used to define all the RFC2544 test parameters. User can configure the length of the test, packet rate, packet size and the resolution rate for the binary search.

Duration- Set the time for each iteration of the test.

Number of trials- The number of times to run the test.

Max Rate%-The max rate to run test.

Throughput Test Initial Utilization: % of the theoretical rate to begin test at.

Loss Tolerance-The % of transmitted packets that can be lost before loss is declared.

Number of Frames for Frame loss Test-The number of frames to be transmitted for each iteration.

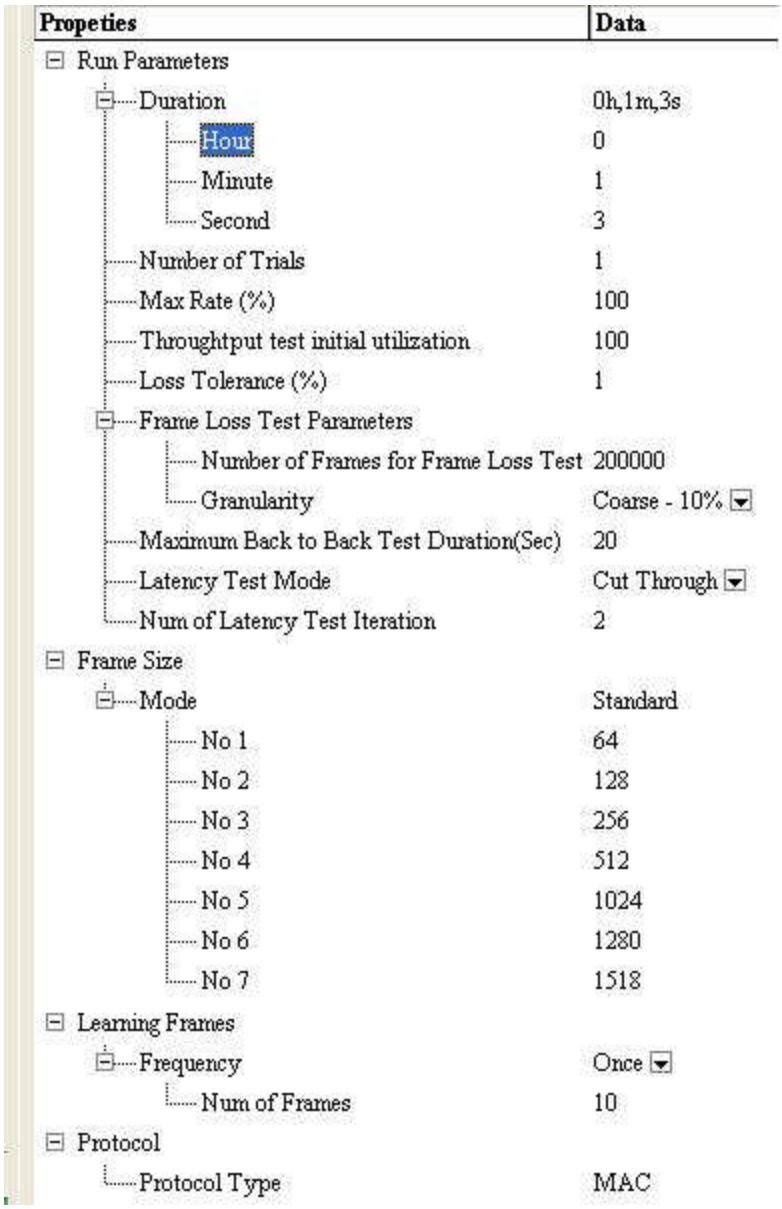
Granularity- The size of the change in frame rate for the next iteration.

Latency Mode-Cut Through or Store & Forward.

Latency Test Iteration- The number of iterations to be used for the latency test.

Frame Size-Standard uses the RFC2544 standard 64, 128, 256, 512 1024, 1280, 1518 frame sizes. Custom allows user selectable frame sizes

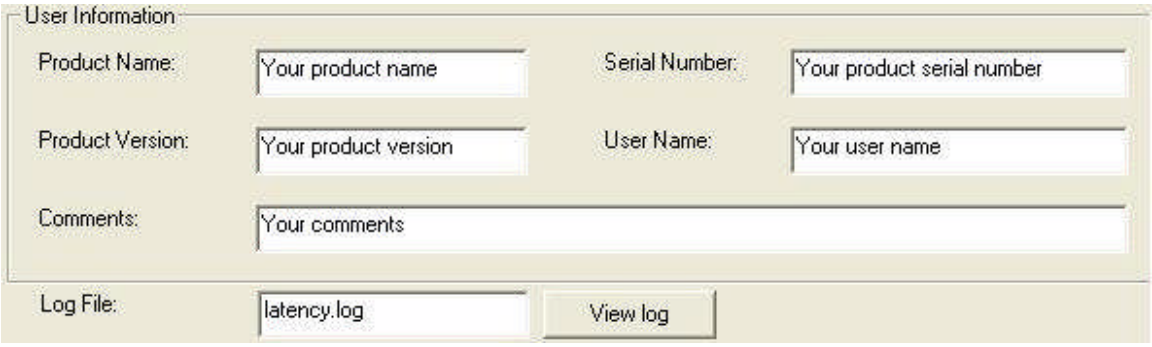
Learning Frames-
Set the # of learning frames and the frequency.



Propeties	Data
⊟ Run Parameters	
⊟ Duration	0h,1m,3s
Hour	0
Minute	1
Second	3
Number of Trials	1
Max Rate (%)	100
Throughtput test initial utilization	100
Loss Tolerance (%)	1
⊟ Frame Loss Test Parameters	
Number of Frames for Frame Loss Test	200000
Granularity	Coarse - 10%
Maximum Back to Back Test Duration(Sec)	20
Latency Test Mode	Cut Through
Num of Latency Test Iteration	2
⊟ Frame Size	
⊟ Mode	Standard
No 1	64
No 2	128
No 3	256
No 4	512
No 5	1024
No 6	1280
No 7	1518
⊟ Learning Frames	
⊟ Frequency	Once
Num of Frames	10
⊟ Protocol	
Protocol Type	MAC

30 Test Log

The test log saves test and CN-100 information in the test log results. The Serial Number, Product Version, Product Name, User Name are saved in the log file. The log file saves the test results in a notepad text file with the User Information, Test start/end time.

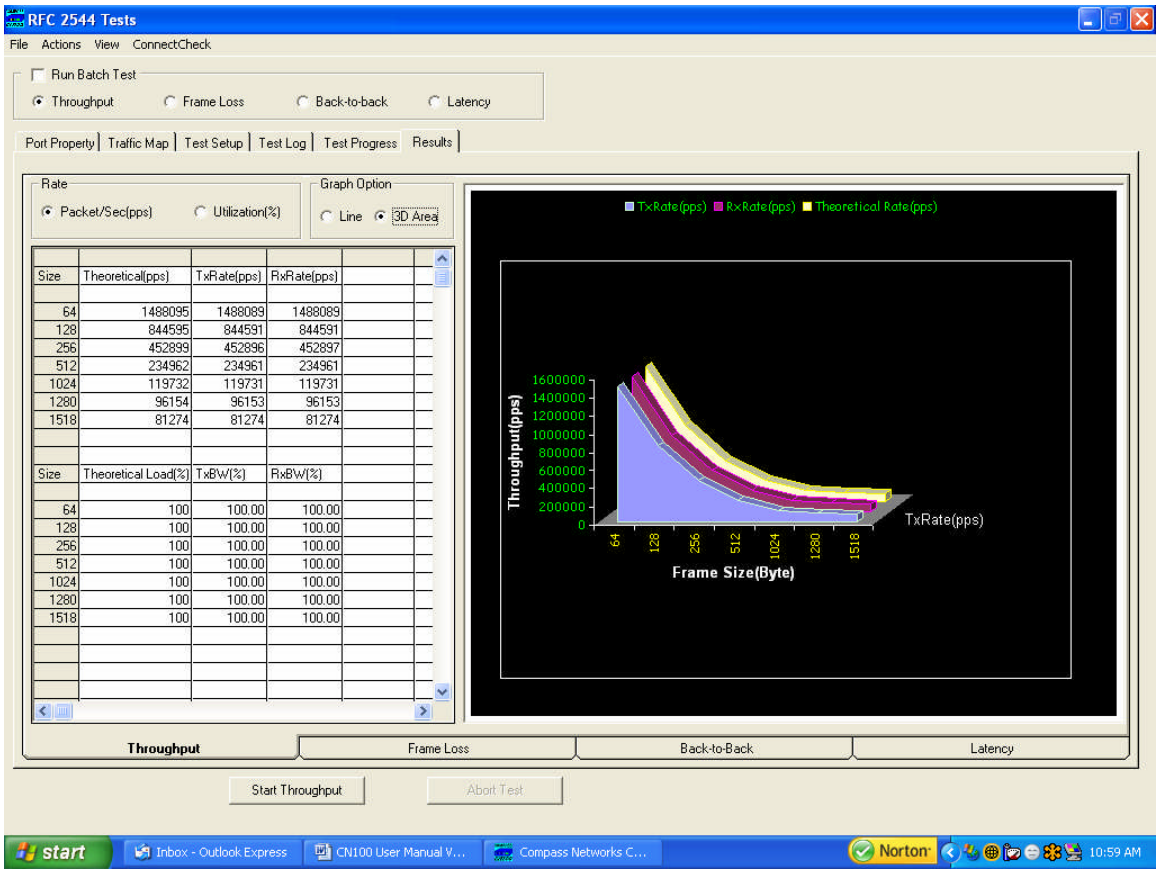


31 Throughput Testing (RFC2544, section 26.1)

The throughput test is used to find the DUT throughput for set of packet sizes including 64, 128, 256, 512, 1024, 1280, 1518. The test is used to find the maximum rate the SUT/DUT can forward all transmitted packets with zero loss. This test also provides a benchmark for other tests.

Packets are sent from one or more of the tester's source ports, through the DUT/SUT to the testers Destination ports. If packet loss occurs, the offered load is reduced and the test is repeated. If no packet loss occurs on the next trial, the load is increased and the test repeated. At the completion of this iteration it compares the number of packets transmitted and received on all streams and the received packet rate (in packets per second). If there is packet loss, the offered load is reduced and test is repeated until there is no loss. If there is no loss the rate is increased until the rate of no loss is determined. The binary search continues until the maximum packet rate without loss is found. The test will transmit packets of a fixed size from all sources to all destinations. The test is repeated until the difference in offered load between successful and failed tests is less than the resolution for the test. This is the zero-loss throughput rate. The results include the packets per second and throughput utilization.

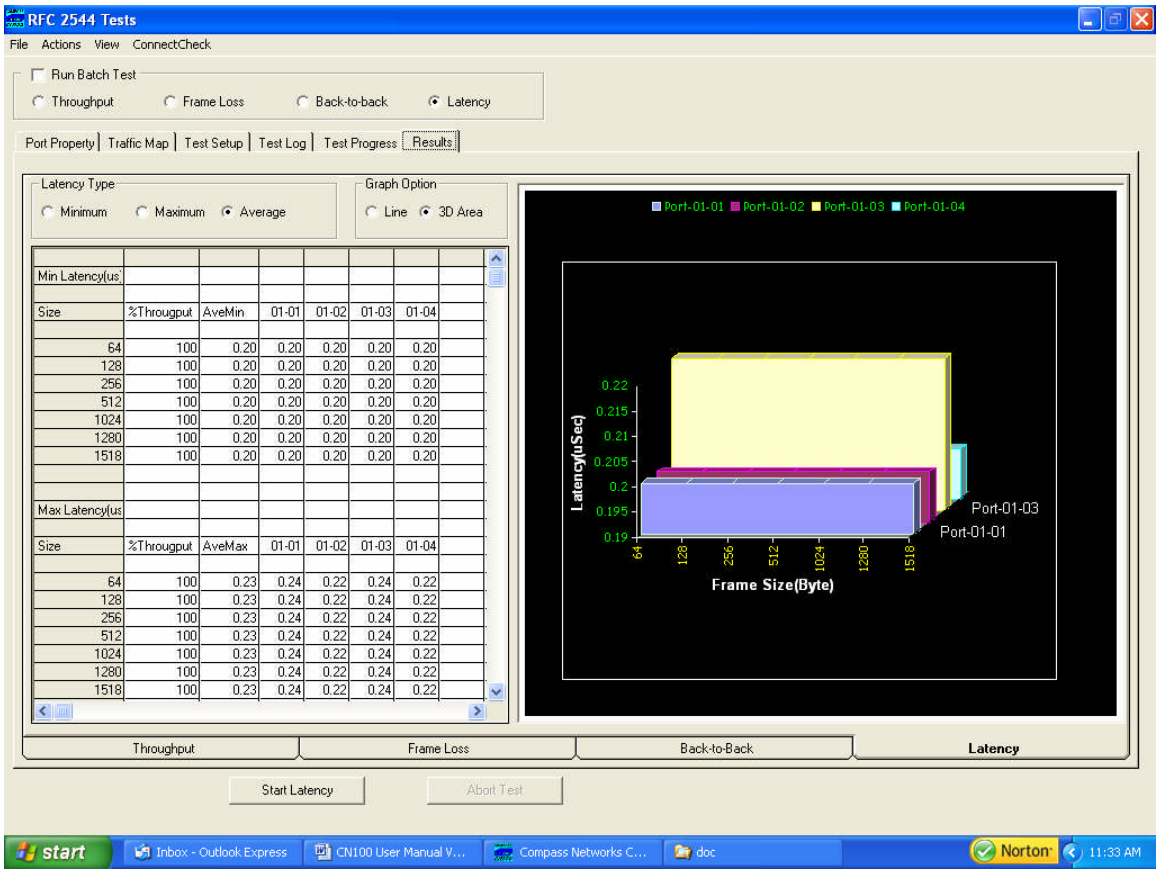
1. Define the traffic mapping Source and destination test ports.
2. Define the test parameters using the test setup screen.
3. Select Test to Run or use batch test to run multiple tests.
4. Click Start (save log file)
5. Test progress shows the script as the test as it is running
6. Select Results and view the desired test results graphs.
7. Select test log, view log to see the log file created during test.



32 Latency Testing (RFC2544, 26.2)

The latency testing determines the latency of the DUT/SUT. Once the throughput is determined, frames of each defined packet size are transmitted from the source test port with a timestamp and when received at the destination test port the latency is calculated. The latency test is timestamp B (receive timestamp) minus timestamp A (transmit timestamp). The minimum, Maximum and Average latency are displayed at the zero loss throughput rate. Latency test for Store and Forward and cut-through testing may be performed.

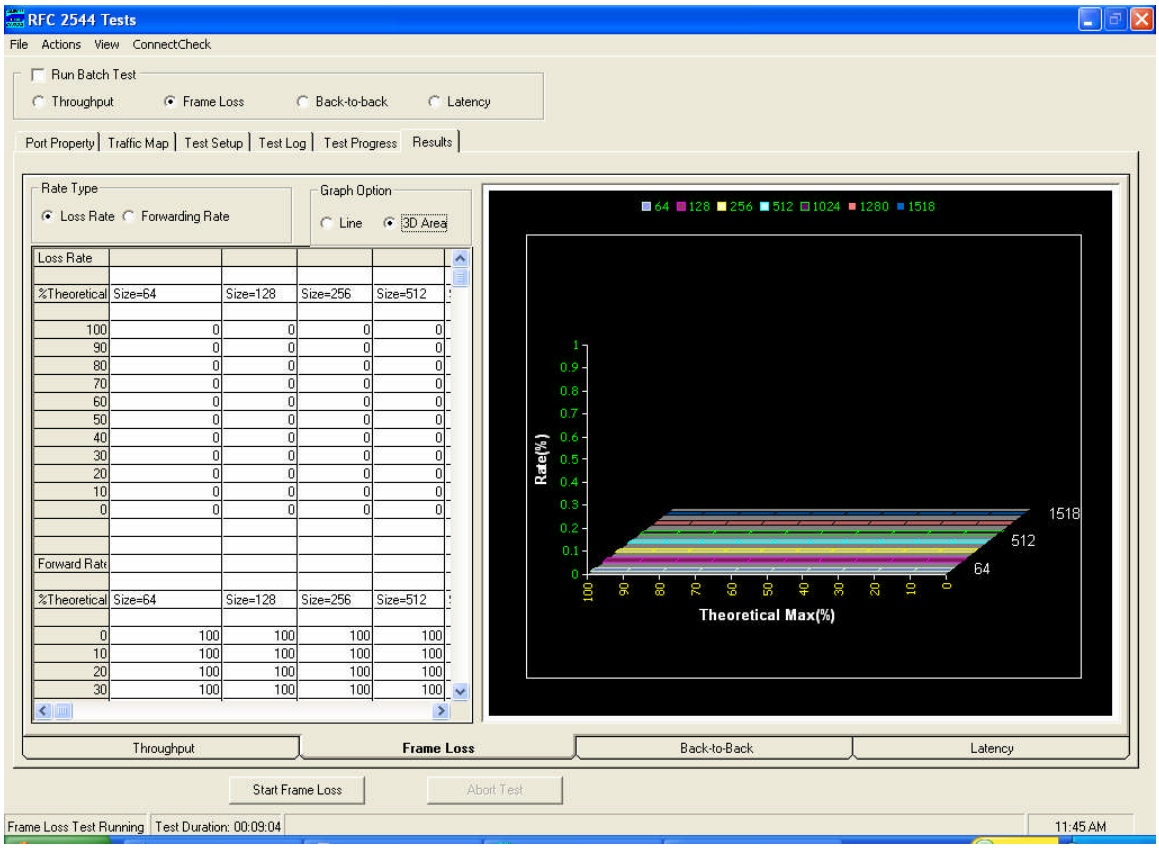
1. Define the traffic mapping Source and destination test ports.
2. Define the test parameters using the test setup screen.
3. Select Test to Run or use batch test to run multiple tests.
4. Click Start (save log file)
5. Test progress shows the script as the test as it is running
6. Select Results and view the desired test results graphs.
7. Select test log, view log to see the log file created during test.



33 Frame Loss Testing (RFC2544, section 26.3)

This test characterizes the forwarding performance of the DUT/SUT as a function of load.
Send packets of a specified size from all sources to all destinations. At each packet size the test determines the forwarding rate and the raw number of lost packets. The offered load is a percentage of the theoretical maximum for that packet size. At the completion of this Iteration, measure the number of packets transmitted and received on all streams. If packet loss occurs the test will reduce the offered load and repeat the test. When two successive trials result in no packet loss, or when the maximum defined rate is reached, the test will go to the next packet size.

1. Define the traffic mapping Source and destination test ports.
2. Define the test parameters using the test setup screen.
3. Select Test to Run or use batch test to run multiple tests.
4. Click Start (save log file)
5. Test progress shows the script as the test as it is running
6. Select Results and view the desired test results graphs.
7. Select test log, view log to see the log file created during test.



Loss Rate				
%Theoretical	Size=64	Size=128	Size=256	Size=512
100	0	0	0	0
90	0	0	0	0
80	0	0	0	0
70	0	0	0	0
60	0	0	0	0
50	0	0	0	0
40	0	0	0	0
30	0	0	0	0
20	0	0	0	0
10	0	0	0	0
0	0	0	0	0

Forward Rate				
%Theoretical	Size=64	Size=128	Size=256	Size=512
0	100	100	100	100
10	100	100	100	100
20	100	100	100	100
30	100	100	100	100

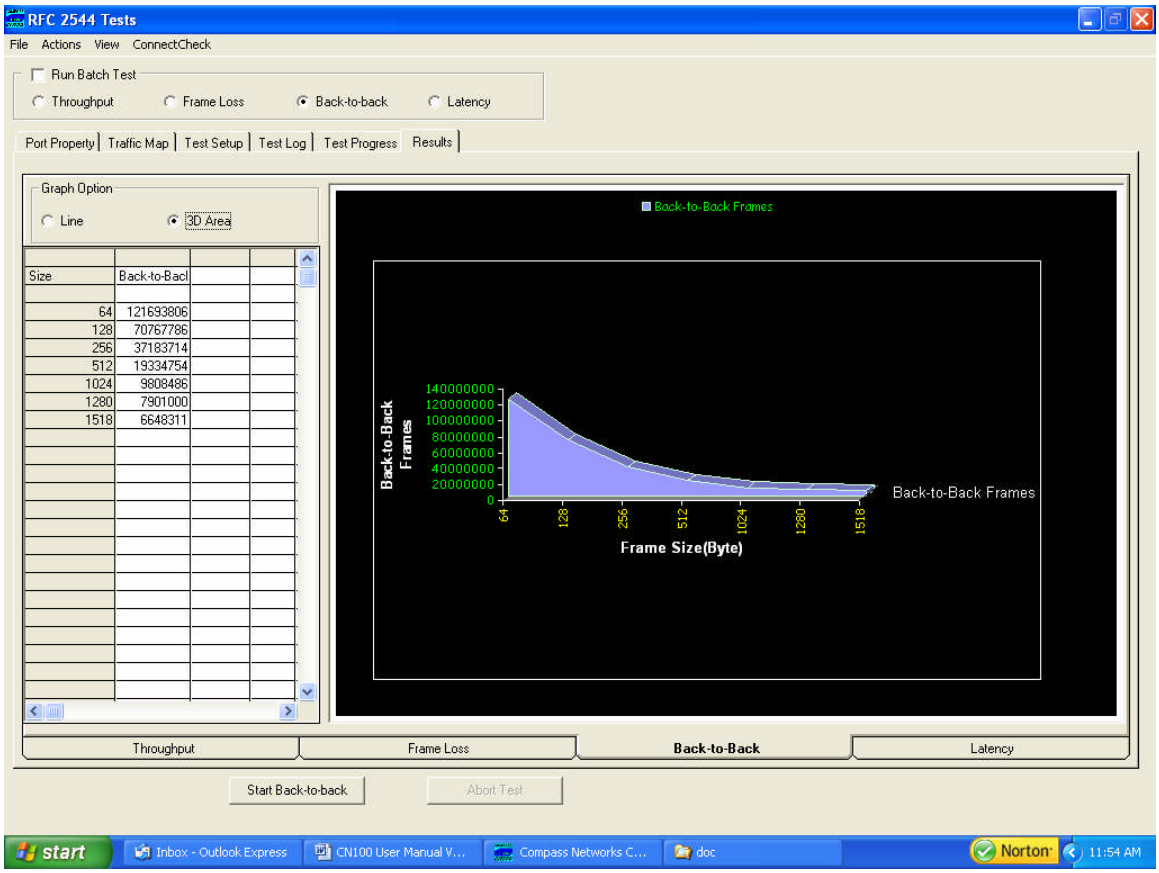
34 Back-to-Back Testing (RFC2544, section 26.4)

This test finds the longest burst of packets (transmitted at full rate with minimal inter-packet gap) that the system under test can forward without packet loss. This test is useful only if the DUT/SUT cannot sustain packet forwarding without loss when the offered load is full rate.

A burst of packets with minimal inter-packet gap is sent from one or more of the tester's source ports, through the DUT/SUT, to the tester's destination ports. If packet loss occurs, the burst length is reduced and the test is repeated. If no loss occurs on the next trial, the burst length is increased and the test repeated. This "binary search" continues until the maximum burst length is found for each packet size. If no packet loss occurs the DUT/SUT has no burst length limit. In a binary search manner, continue to increase or decrease the number of packets in subsequent iterations until the difference in the number of packets between successful and failed tests is less than the resolution for the test. This is the maximum back-to-back burst length for the packet size used.

Test duration (length of initial burst). The number of packets must be high enough that the time it takes to send the total number of packets with minimal inter-packet gap at maximum offered load is equal to or greater than two seconds.

1. Define the traffic mapping Source and destination test ports.
2. Define the test parameters using the test setup screen.
3. Select Test to Run or use batch test to Run multiple tests.
4. Click Start (save log file)
5. Test progress shows the script as the test as it is running
6. Select Results and view the desired test results graphs.
7. Select test log, view log to see the log file created during test.

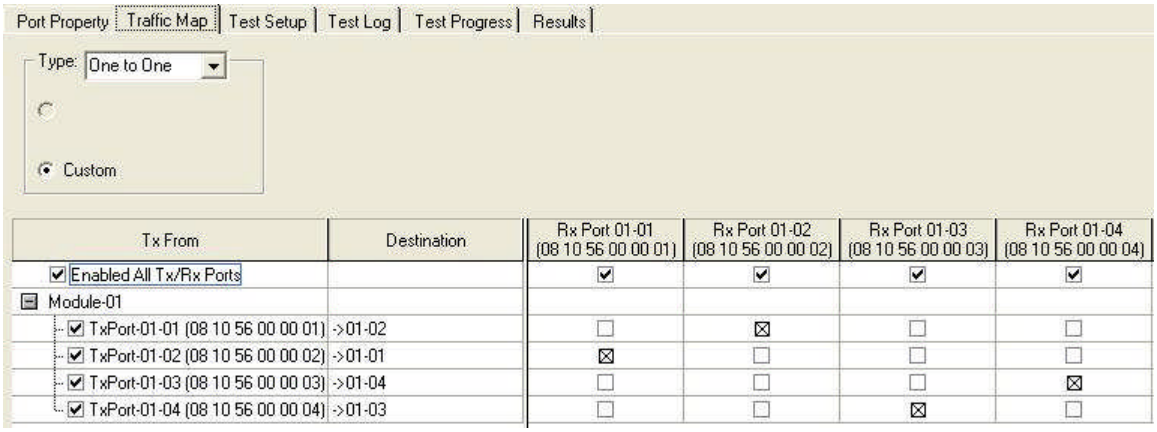


35 RFC2544 Throughput Tutorial #1

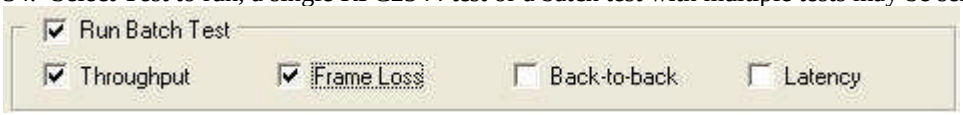
This tutorial will walk you through the basic configuration of the RFC2544 Throughput test. The test will transmit traffic from the test source port through the system under test (SUT) or device under test (DUT). Please configure the DUT/SUT so the traffic will be forwarded to the receive test ports. Each available test port should be connected to the DUT/SUT with the appropriate cable for the DUT/SUT ports The tester will compare the number of accepted packets on the receive ports with the number of transmitted packets. . The throughput test will provide the maximum rate the DUT/SUT can forward packets without any of the offered packets being lost. Results will include the packets per second and %utilization for each packet size.

Configure the DUT/SUT ports so the traffic from the CN-100 source test ports will be forwarded to the CN-100 receive test ports. Once you have established a connection between the CN-100 Manager Software and the CN-100 chassis you want to use for the test please follow the following steps.

27. Boot Up Chassis and connect appropriate Ethernet Management Cable or Serial cable on the back of the chassis.
28. Launch CN-100 Manager GUI.
29. Connect to the Chassis, a connection can be verified by the status bar on the bottom left corner of the CN-100 Manager GUI.
30. Install a patch cord to connect the desired test ports. (with the cables connected a green link LED should be seen on each of the connected ports)
31. The CN-100 will autonegotiate the speed and duplex of the each test port. (to manually set the speed/duplex of the test ports you need to close the RFC2544 test and from the Main Manager Screen right-click on each port to set the speed/duplex and then reopen the RFC2544 test)
32. From the main CN-100 Manager screen please click “tests”, select RFC2544


Port Property
Traffic Map
Test Setup
Test Log
Test Progress
Results
Type:
One to One
Custom
Tx From
Destination
Rx Port 01-01 (08 10 56 00 00 01)
Rx Port 01-02 (08 10 56 00 00 02)
Rx Port 01-03 (08 10 56 00 00 03)
Rx Port 01-04 (08 10 56 00 00 04)
Enabled All Tx/Rx Ports
Module-01
TxPort-01-01 (08 10 56 00 00 01) ->01-02
TxPort-01-02 (08 10 56 00 00 02) ->01-01
TxPort-01-03 (08 10 56 00 00 03) ->01-04
TxPort-01-04 (08 10 56 00 00 04) ->01-03

33. From the traffic Mapping tab, please select one to one. The default setup for One to One sets the CN-100 ports 01-01 to 01-02, 01-01 to 01-02, 01-03 to 01-04, 01-04 to 01-03 or you can manually configure the port mapping.
34. Select Test to run, a single RFC2544 test or a batch test with multiple tests may be selected.



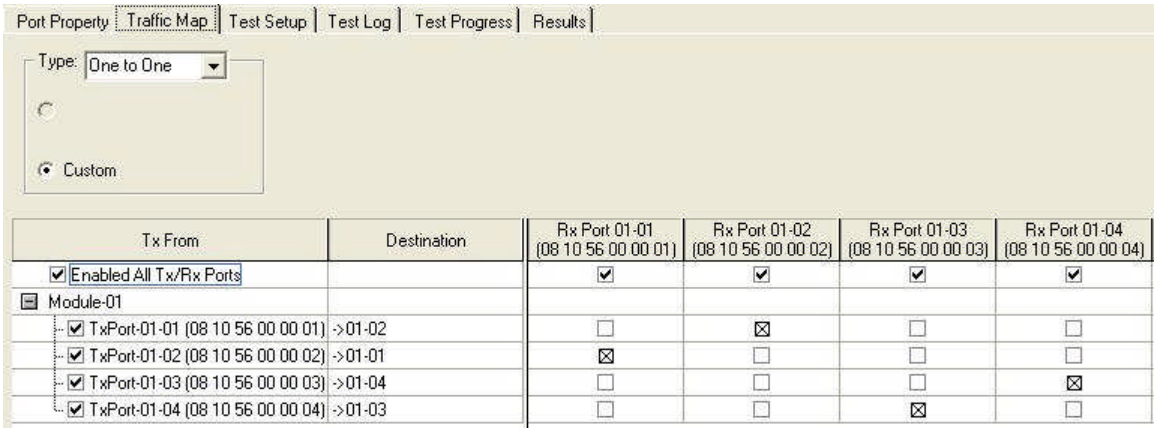
35. From the Test Setup tab, the test parameters may be configured or left as default. The test parameters include: Duration, Initial Load, Tolerance, Packets Sizes.
36. Click “Start Throughput Test”, it will prompt you to save log file, name file and the test will begin.
37. The test progress tab shows the current state of the selected tests.
38. Results Tab, shows the test results for the throughput test in numerical value and graphical format.
39. The complete test log can be viewed under the Test Log Tab, “View Log”.

36 RFC2544 Tutorial #2

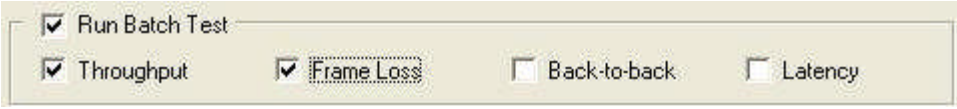
This tutorial will walk you through the basic configuration of a batch test that includes all 4 RFC2544 tests including Throughput, Frame Loss, Back-to-Back, Latency. The test will transmit traffic from the test source port through the system under test (SUT) or device under test (DUT). Please configure the DUT/SUT so the traffic will be forwarded to the receive test ports. Each available test port should be connected to the DUT/SUT with the appropriate cable for the DUT/SUT ports.

Configure the DUT/SUT ports so the traffic from the CN-100 source test ports will be forwarded to the CN-100 receive test ports. Once you have established a connection between the CN-100 Manager Software and the CN-100 chassis you want to use for the test please follow the following steps.

1. Boot Up Chassis and connect appropriate Ethernet Management Cable or Serial cable on the back of the chassis.
2. Launch CN-100 Manager GUI.
3. Connect to the Chassis, a connection can be verified by the status bar on the bottom left corner of the CN-100 Manager GUI.
4. Install a patch cord to connect the desired test ports. (with the cables connected a green link LED should be seen on each of the connected ports)
5. The CN-100 will autonegotiate the speed and duplex of the each test port. (to manually set the speed/duplex of the test ports you need to close the RFC2544 test and from the Main Manager Screen right-click on each port to set the speed/duplex and then reopen the RFC2544 test)
6. From the main CN-100 Manager screen please click “tests”, select RFC2544


Port Property
Traffic Map
Test Setup
Test Log
Test Progress
Results
Type:
One to One
Custom
Tx From
Destination
Rx Port 01-01 (08 10 56 00 00 01)
Rx Port 01-02 (08 10 56 00 00 02)
Rx Port 01-03 (08 10 56 00 00 03)
Rx Port 01-04 (08 10 56 00 00 04)
Enabled All Tx/Rx Ports
Module-01
TxPort-01-01 (08 10 56 00 00 01) ->01-02
TxPort-01-02 (08 10 56 00 00 02) ->01-01
TxPort-01-03 (08 10 56 00 00 03) ->01-04
TxPort-01-04 (08 10 56 00 00 04) ->01-03

7. From the traffic Mapping tab, please select one to one. The default setup for One to One sets the CN-100 ports 01-01 to 01-02, 01-01 to 01-02, 01-03 to 01-04, 01-04 to 01-03 or you can manually configure the port mapping.
8. Select Test to run, a single RFC2544 test or a batch test with multiple tests may be selected.



9. From the Test Setup tab, the test parameters may be configured or left as default. The test parameters include: Duration, Initial Load, Tolerance, Packets Sizes.
10. Click “Start BatchTest”, it will prompt you to save log file, name file and the test will begin.
11. The test progress tab shows the current state of the selected tests.
12. Results Tab, shows the test results for each test in numerical value and graphical format.
13. The complete test log can be viewed under the Test Log Tab, “View Log”.

The RFC2544 batch test running the Throughput test, Frame Loss test, Back-to-Back test, Latency test will provide the following results for each packet size.

Throughput test provides: Rate at which the DUT/SUT can forward at zero loss packet rate.
Back-to-Back test provides: Longest burst size the SUT/DUT can handle without packet loss.
Frame Loss Test provides: Forwarding rate and raw number of lost packets.
Latency Test provides: Minimum, Maximum and average latency.